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BY L. M. KLAUBER.

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BY FORD W. HARRIS.

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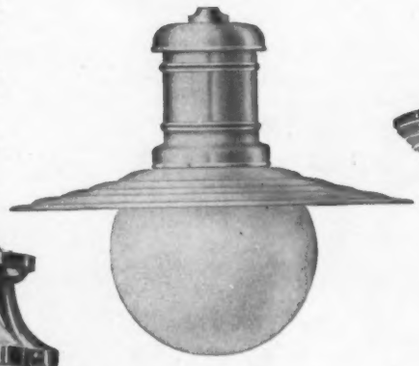

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POWER AND GAS
Devoted to the Conversion, Transmission and Distribution of Energy

VOLUME XXXIII SAN FRANCISCO, OCTOBER 10, 1914 NUMBER 15

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THE MUNICIPAL RAILWAYS OF SAN FRANCISCO

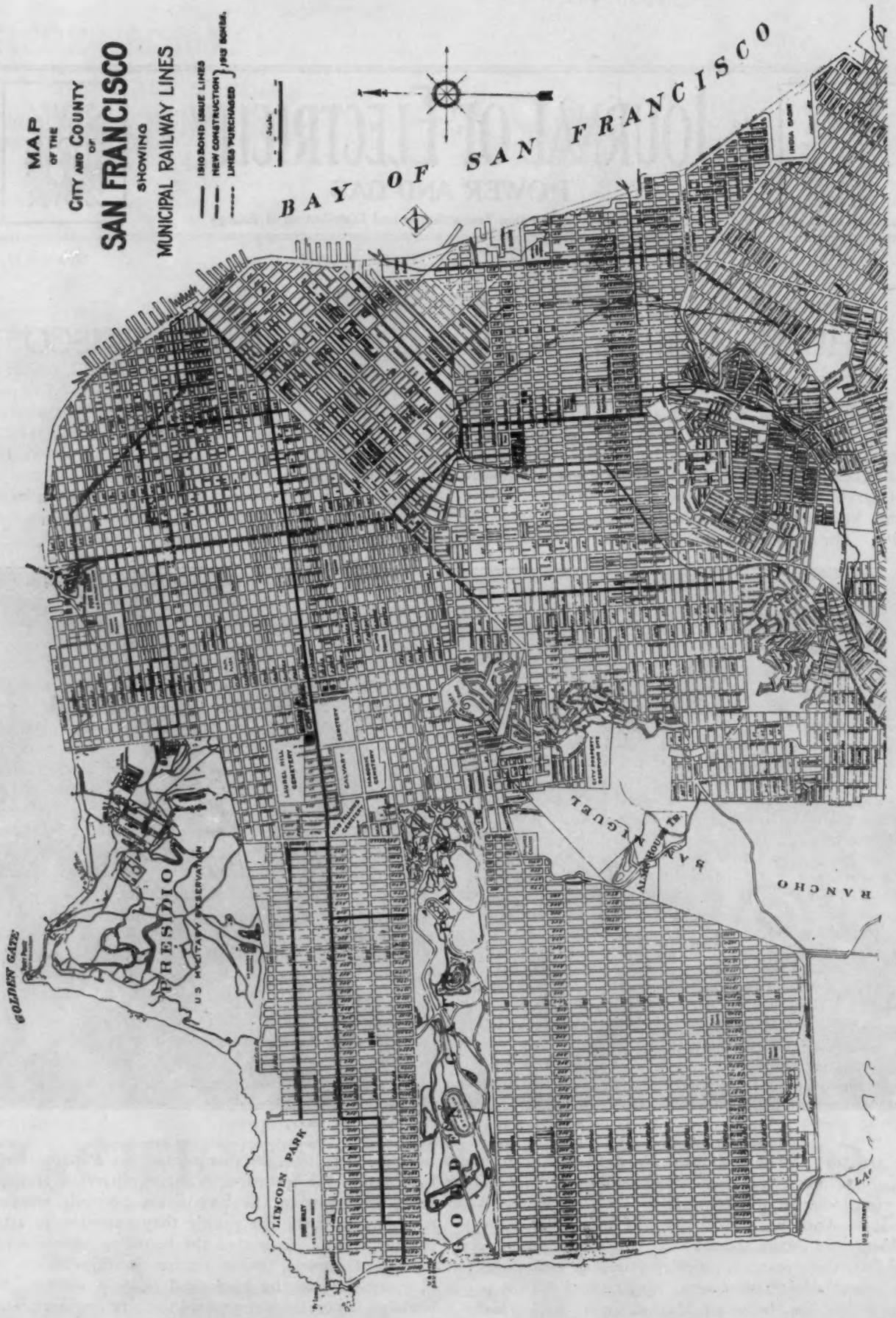
BY PAUL J. OST.

The project for a municipal electric railway system at San Francisco has been agitated for many years. Just a few days before the disaster of 1906 bids were received for the building of an electric railway on Geary street over the route of the old Park & Ocean Railway, whose cable franchise was about to expire. The money for this work was on hand in the city treasury. The great fire, however, stopped the consummation of the plans, as the money had to be diverted to more urgent uses.

It was not until 1910 that the municipal railway problem was again opened. At this time bonds were voted for the construction of the present Geary street line, comprising 15.08 miles of single track. That portion of the line between Market street and Thirty-third avenue was opened to traffic on December 28, 1912. Those portions on Market street and west of Thirty-third avenue to the beach were opened June 25, 1913. This road has been a paying proposition from the start and present indications, judging by the continued increase in receipts, are that the road has not as yet reached its maximum popularity.

Track Construction at Van Ness Avenue and Geary Street.

Early in 1913, the directors of the Panama-Pacific International Exposition, realizing that the transportation facilities to the Exposition grounds were not adequate to carry the people they expected to attend the Exposition, requested the board of supervisors to provide additional transportation facilities in the way of extensions to the municipal railway system. The board of supervisors requested the city engineer, M. M.



Map Showing Municipal Railway System of San Francisco.

O'Shaughnessy, to make a study of the conditions and recommend routes over which such lines might be constructed. This study was quite exhaustive—going into matters of finance as well as matters pertaining to the physical conditions. The studies along the financial side indicated that the receipts from the Exposition traffic would not, under any circumstances, be sufficient to produce sufficient profits to pay outright for the roads constructed. This meant that any line built which would not be a paying line after the Exposition period would be a loss to the city.

The following lines were recommended by the city engineer in his report of April 5, 1913, and will form the backbone of a municipal railway system covering the entire city; all being lines which it will pay to operate after the Exposition is over. The routes proposed were as follows:

1—The purchase of the Union street line of the Presidio & Ferries Railroad, extending from the Ferries to the Presidio, over Columbus avenue and Union street, a total distance of 3.77 miles.

2—Van Ness and Chestnut street line, commencing at Van Ness and Market, along Van Ness to North Point with an extension along the south line of the Exposition grounds commencing at Van Ness and Chestnut thence westerly on Chestnut to Scott and over Scott, Greenwich and Steiner streets to Steiner and Union, there connecting with the Union Street line, this extension forming a double loop just outside of the Fair grounds. The total length of this line was 3.38 miles.

3—Eleventh and Potrero avenue line, connecting with the Van Ness avenue line at Van Ness and Market, thence along Eleventh to Division, Division to Portreo, and Potrero to Twenty-fifth, a total distance of 2.08 miles.

4—Stockton street and Columbus avenue line, from Stockton and Market streets along Stockton street through the Stockton street tunnel to Columbus avenue connecting with the Union street line, thence along Columbus avenue to North Point street, along North Point street to Van Ness avenue connecting with the Van Ness avenue line. Included in the recommendation for this line was the construction of a line through Fort Mason Military Reservation to Beach and Laguna street where a loop terminal would give access to the rear entrance of the Exposition and also provide street railway facilities to the transport docks. The total length of these lines was to be 2.51 miles.

5—California street line. The United Railroads' franchise covering the right to operate over California street between Second avenue and Thirty-third avenue was about to expire. It was, therefore, recommended that a municipal line be operated over California street as a branch of the Geary street line connecting with the Geary street line at Second avenue and Geary street, thence over Second avenue, Cornwall street, and California street to Thirty-third avenue and California street, a length of 2.07 miles.

6—Church street line. A line connecting with the Van Ness avenue line at Market, thence along Market street to Church street and south on Church street to Thirtieth street, a distance of 2.65 miles.

This meant that the city would acquire a total of 16.46 miles of double track or 32.92 of single track. This, with the Geary street line already in operation, would mean a total mileage of the municipal railways of 48 miles of single track. This report was adopted by the board of supervisors and on August 26, 1913, the people were asked to vote $3,500,000 in bonds to carry on the work. The bond election carried and the city engineer promised that if allowed to proceed with the work without hindrance practically all of the lines could be complete and ready for operation on January 1, 1915. Voting the bonds, however, did not provide ready cash so that it was not until September, 1913, that the supervisors were able to provide the city engineer with $15,000 with which to commence the preparation of plans and specifications.

It was early appreciated that some definite campaign must be planned in order that the work might be completed on time and with the least possible cost. Track, trolley, feed cables, cars and car barns must all be brought into synchronism so that there would be no time when a piece of track was lying idle awaiting the arrival of cars to run over it, or that the reverse exist—cars standing in the barn awaiting the construction of track to run over.

Careful study of all the conditions involved made it possible to so let out the work that as soon as money was spent it was possible to begin operation, thereby earning interest on the capital invested. The board of supervisors promptly took the necessary steps to secure the sale of the bonds and early in December the specifications were ready: On December 31st bids were received for rails and rail joints, tie rods, tie plates and braces, spikes, ties, track specials, car bodies, car trucks, motor equipments and air brakes and the board of public works awarded contracts for $900,000 worth of material on January 2d. This was the earliest date on which contracts could be awarded legally as until this time no money was available and the charter requirements are such that money must be on hand in the treasury before contracts may be awarded.

This condition made it necessary for all of the work of construction to be completed within one year. Careful studies had been made of the market conditions and the contracts as prepared called for deliveries as early as could be expected under ordinary conditions. In order, however, to hasten the delivery as much as possible, each contract had a bonus and penalty clause inserted. Contractors were permitted to earn a bonus for early delivery of material, this bonus in most cases equalling approximately 6 per cent of the estimated amount of the contract. They were likewise penalized for each day consumed over and above the time specified. All of the material was not required at one time, in most cases 25 per cent being delivered at the earliest possible date while the remainder was to come forward in progressive shipments such as to permit the work to continue at a uniform rate.

The program as originally prepared has been carried out almost without change. In a few instances unfortunate and unavoidable delays have occurred. The greatest of these delays has been due to the discussion by the property owners as to gradients over which the Church street line would run. This is a matter entirely out of the control of the city engineer's office. If the stringency of the money market does not prevent the selling of the remainder of the bonds it is believed that all of the lines with the exception of the Church street line can be completed by January 1st or shortly thereafter.

Three of the proposed lines are already in service. The Union street line was taken over and placed under municipal control on December 10, 1913, the fran-

chise having expired on December 1st. The Van Ness avenue line was placed in service August 15, 1914. This date was eleven days less than one year from the time when the bonds were voted by the citizens and indicates the rapidity with which the work had been carried out. The second line to go into service was the Potrero avenue line over which cars commenced to operate on September 7th. Both of these lines were opened on practically the day set in the program.

To do this has meant a careful watch of the program, as it was essential that the contracts and specifications be ready on a certain date and that material be received by the time indicated on the progrem. Every man connected with the work was given to understand that he was directly responsible for the particular part entrusted with him and that his duty must be so performed as to fit the program time. At times

Interior of Municipal Car.

the burden has been particularly heavy but everyone has worked with a will, knowing that they were making a new record for railway building.

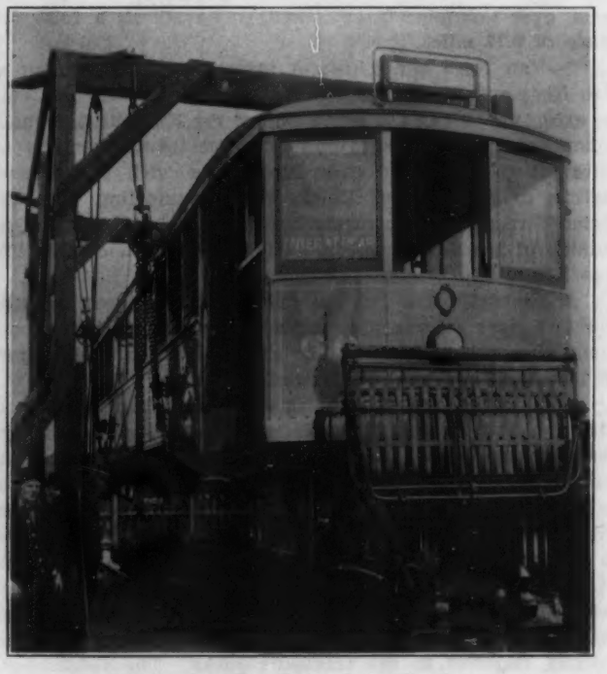
When the Geary street line was under construction it was proposed to generate our own power. To this end, a substation room was built in the Geary street car barn and a lot was purchased for a generating station at North Beach. Plans and specifications were prepared for substation machinery and bids called for.

Before commencing work on the generating station it was thought advisable to receive proposals for furnishing electric current. After some discussion there was also included in this contract the furnishing of 600 volt direct current delivered to the trolley wires. When the bids were opened it was found that the prices for the direct current were such as to make it advisable for the city to buy its trolley current delivered, the Pacific Gas & Electric Company being the successful bidders. No award of contract was made for the substation equipment and the generating plant was not built.

In the contract signed by the Pacific Gas & Electric Company, provision was made whereby the city might demand power for operating lines other than the Geary street line although no such lines were contemplated at that time. To operate the Geary street line, the Pacific Gas & Electric Company installed three 1000 k.w. and one 575 k.w. motor generator sets. As soon as the bond issue for the new lines was authorized the company was requested to install another 7000 kw.

These machines are being placed in the company's regular substations, which are so spaced as to make the points from which trolley current is distributed not over a mile and one-half apart. This, it will be readily understood, allows the municipal railway to use short and fairly light feeders, besides insuring that the crippling of one station will not destroy the service to the entire system.

It is interesting to note in passing that the contract with the Pacific Gas & Electric Company provides

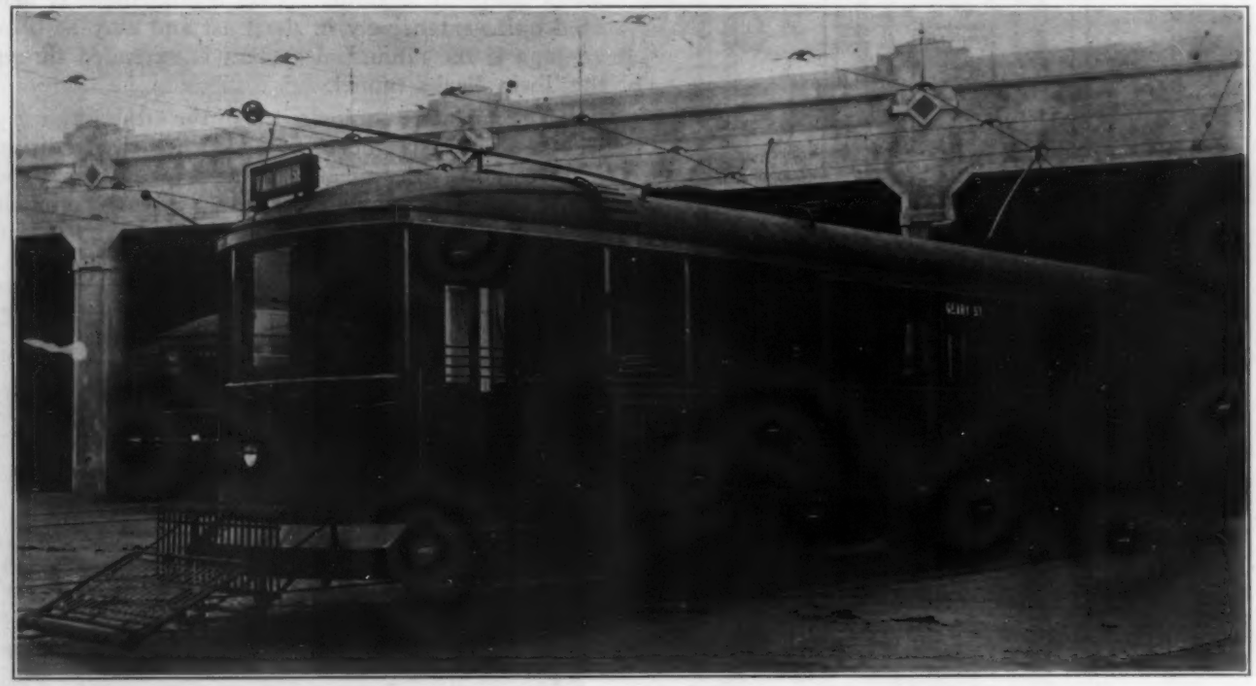


Lowering Car Body Onto Trucks.

a penalty for interrupted service. A total of 20 minutes interruption in 24 hours penalizes the company to the extent of all the current consumed during that day. An aggregate of one hour of interruptions during any 24 hour penalizes the company to the extent of a whole week's revenue, while an aggregate of 3 hours interruption in a day gives the city the privilege of cancelling the contract at any time they see fit without any objection on the company's part. So far, the company has maintained its service most admirably and every one has been well pleased.

There has always been more or less objection to the use of unsightly overhead feed cables. They are heavy and a possible source of trouble at any time, being especially dangerous in case of fire. The city, in order to do away with this unsightly overhead work, has placed all of the feed cables on Geary street east of Presidio avenue underground, and are placing all of the feeder cables on Van Ness avenue and east and on Potrero avenue and Eleventh street underground.

This has necessitated the building of underground conduits in connection with the track and the installation of risers at points where connection is made between the underground cables and the trolley wires. The underground conduit on the Geary street line consists of multiple clay conduits encased in concrete. All of the new conduits are being laid with fiber conduit, 217,130 ft. being ordered for this work. This includes only the conduit running parallel to the railway tracks. Where it was necessary to make a connection to the station of the Pacific Gas & Electric Company, the conduit connecting the railway with the station has been furnished by the electric company The municipal railway, however, is furnishing the cable which goes into this conduit. This in itself amounts to 57,000 lineal feet.



Cars at Municipal Car Barn.

The underground conductors in the conduits parallel to the railway total almost 40,000 lineal feet. These cables vary in size between 250,000 c.m. and 1,000,000 c.m. All positive cables are insulated with 5/32 inch of paper covered with a lead sheath. The negative cables are double-braid weatherproof, the largest of these being 2,000,000 c.m. in size. One heavy run of negative return goes across the Exposition grounds at Buchanan street and consists of almost 7,000,000 c.m. in the form of second hand Edison tubes.

In calculating the size of feeders required, the average number of cars was considered, allowing a drop of 100 volts at the extreme end of the section. This, however, does not cover the exact conditions, for with a fair load it was found that cables which would carry the maximum load with a drop of not in excess of 100 volts would not be sufficient capacity to carry the amperage without undue heating, so that in most instances where the traffic will be congested the cables are of such capacity as to keep the drop well under 50 volts with maximum load. Those of you who are in the habit of reading on the street car will appreciate that this means that you can have sufficient light to read your newspaper on the way home in the evening without being able to follow the operation of the car controller by the intensity of the light. This also means a considerable saving in power.

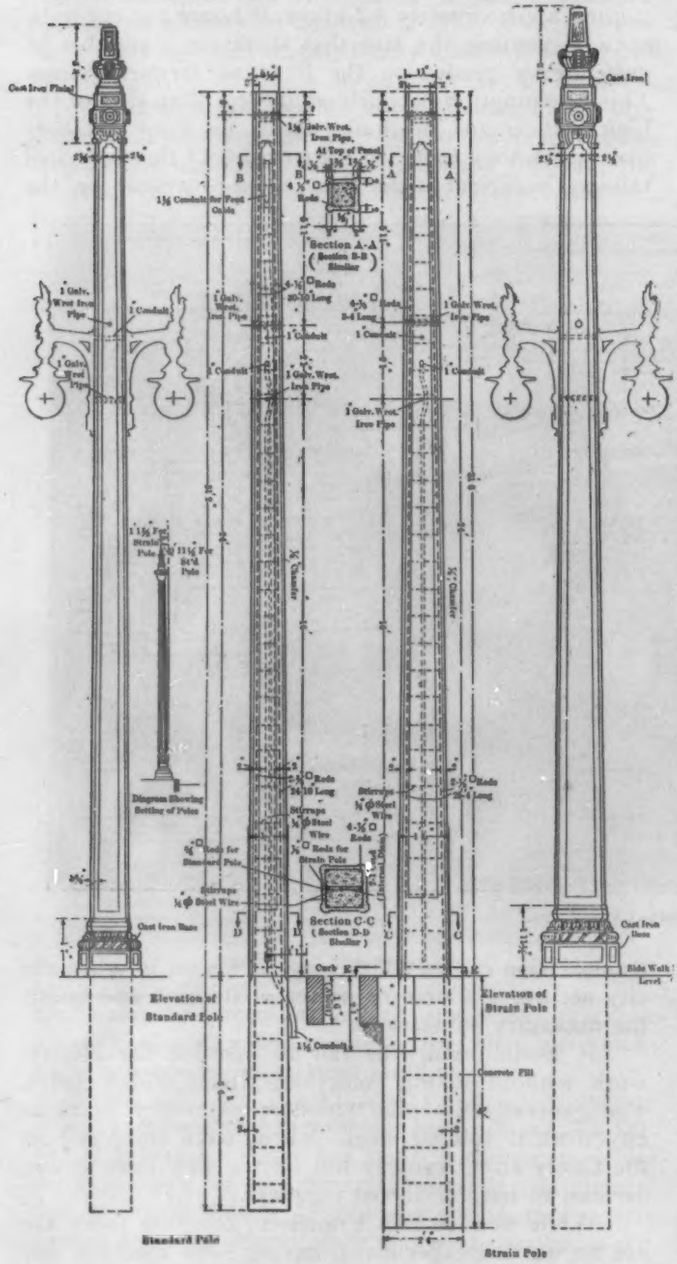
The Geary street line at the present time is consuming approximately 4.2 kilowatt hours per car mile, notwithstanding the fact that there are a number of quite heavy grades on the line and frequent stops. This consumption is considerably less than that of the United Railroads, no doubt due to the long distances over which they feed. In the conduits of the municipal railway sufficient space has been provided for the transmission cables which may be drawn in when the city secures a source of power of its own and builds the necessary substations.

It would hardly be fair to mention the electric work without saying something about trolley poles. The generally accepted standard of trolley poles in city work is tubular steel. These were employed on the Geary street railway but on the new lines it was decided to use reinforced concrete.

While new to San Francisco, concrete poles are not an untried experiment, having been used for line poles and for the suspension of trolley wires at various places in the East. It was necessary to provide some particular type of construction for the Van Ness avenue poles, this location requiring ornamental poles. The ornamentation of steel poles has not been very successful in San Francisco, due to the fact that the steel rusts badly under the ornament. It is also expensive to maintain the paint in satisfactory condition. It was also the wish that the Van Ness poles, in addition to being ornamental might provide facilities for eventually lighting the street.

The concrete poles now in place on Van Ness avenue are fully equipped with conduits inside of the pole

and means for attaching cast iron lighting brackets. It is intended that each pole should bear two brackets, lying in a line parallel to the curb, each one of these brackets supporting a 200 c.p. tungsten lamp. The cast iron base, aside from being an ornament, provides space in which terminals may be housed. Along the west side of Van Ness avenue there was laid, in con-



Vertical Section of Concrete Trolley and Lighting Pole.

junction with the conduit for the propulsion current, such duct as was necessary to handle the lighting cables. These ducts are all connected into the poles. The proposed scheme of lighting would give Van Ness avenue an illumination almost six times as intense as the present gas lamps.

In closing it may not be amiss to say a few words on the motor equipment of the new cars. Each car of both the Geary street line and the new cars is equipped with four motors rated at 60 h.p. when supplied with 600 volts. The cars weigh approximately 48,000 pounds. This means that the cars are a little heavier motored than any other cars in use in San Francisco. This gives quick acceleration and a good speed on the grades.

The control equipment is also a little different than that in use on western street railways. This equipment consists of remote control apparatus which takes all heavy currents off the platform and reduces the size of the controller, giving more platform space, which is of vital importance to the prepayment type of car. By making some slight changes in the brake equipment and the addition of radial draw-bars and a train cable, this equipment will permit of the cars being operated in trains. This arrangement is being used quite extensively in the East and may be of advantage if the municipal system is extended through the Twin Peaks tunnel.

The air brake equipment is of the straight air type. The new cars have been provided with two additional features consisting of an automatic emergency brake valve and conductor's emergency valves, permitting the conductor to apply the brakes in case of emergency.

Concrete Trolley Pole.

It has not been the intention of the city engineer to produce anything which would be an innovation in electric railway work. For this reason nothing startlingly new is to be mentioned in connection with the municipal railways but we feel that no one can gainsay that San Francisco has secured a modern system employing the best methods of construction known.

Careful records have been made of the cost of doing the work and it is believed that our figures compare very favorably with those for similar classes of work done by corporations in all parts of the country. San Francisco may, therefore, be justly proud of the fact that she is doing a large job quickly, doing it as well as it is possible to do it, and at the same time doing it as cheaply as anyone could do it.

ELECTRIC DISTRIBUTION

STANDARDS AT SAN DIEGO.

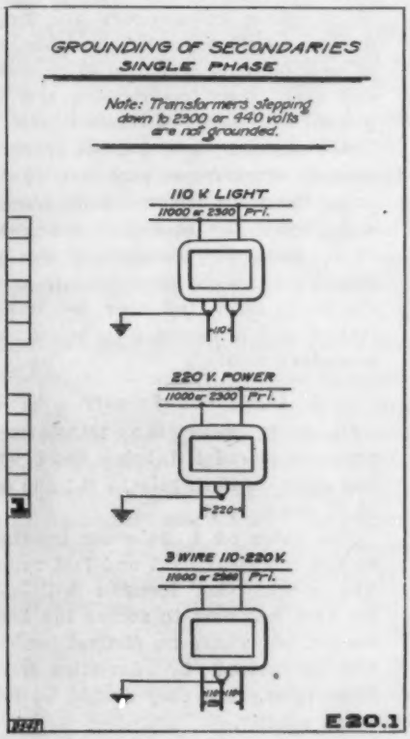
E. Transformers.

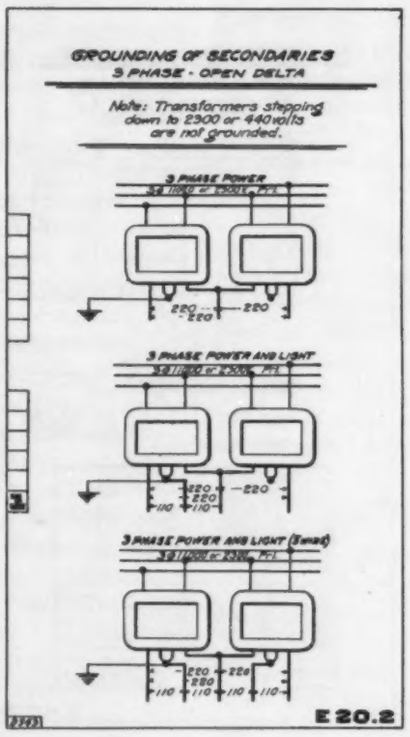
BY L. M. KLAUBER.

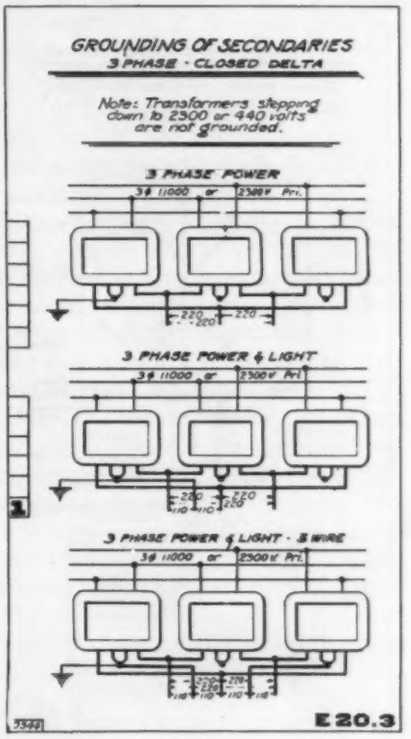
[Continued.]

E 20: Grounding. The three sheets in this section show the connections used in grounding secondaries to comply with the N. E. Code. For the method of grounding see sheet D 90.1. In delta or open delta connected secondaries, where the neutral of the system is not available, the grounding of the middle point of one transformer is preferred to grounding one of the line wires, since by this means the maximum voltage to ground is reduced from 220 to 190 volts.

E 30: Fuses for Transformers. Transformers having 2300 volt primaries are fused for approximately twice rated load; 11,000 volt transformers for about 50


GROUNDING OF SECONDARIES
SINGLE PHASE
Note: Transformers stepping down to 2300 or 440 volts are not grounded.
110 V. LIGHT
11000 or 2300 Pri.
220 V. POWER
11000 or 2300 Pri.
3 WIRE 110-220 V.
11000 or 2300 Pri.
E 20.1


GROUNDING OF SECONDARIES
3 PHASE - OPEN DELTA
Note: Transformers stepping down to 2300 or 440 volts are not grounded.
3 PHASE POWER
3 PHASE POWER AND LIGHT
E 20.2


GROUNDING OF SECONDARIES
3 PHASE - CLOSED DELTA
Note: Transformers stepping down to 2300 or 440 volts are not grounded.
3 PHASE POWER
3 PHASE POWER & LIGHT
3 PHASE POWER & LIGHT - 3 WIRE
E 20.3

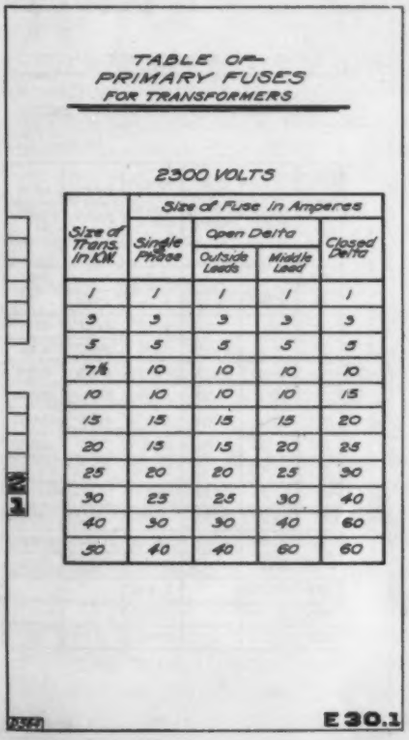


TABLE OF PRIMARY FUSES FOR TRANSFORMERS

2300 VOLTS

Size of Trans. in KW.	Size of Fuse in Amperes			
	Single Phase	Open Delta		Closed Delta
		Outside Leads	Middle Lead	
1	1	1	1	1
3	3	3	3	3
5	5	5	5	5
7½	10	10	10	10
10	10	10	10	15
15	15	15	15	20
20	15	15	20	25
25	20	20	25	30
30	25	25	30	40
40	30	30	40	60
50	40	40	60	60

E 30.1

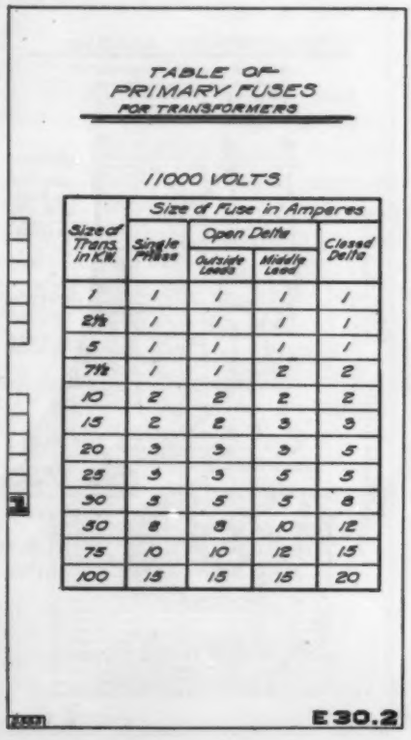
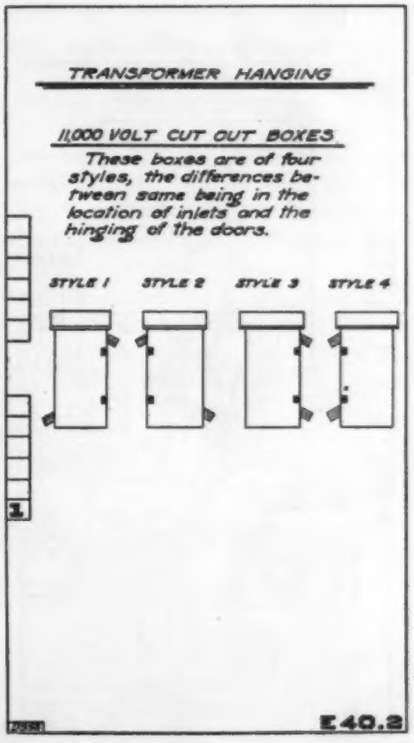


TABLE OF PRIMARY FUSES FOR TRANSFORMERS

11000 VOLTS

Size of Trans. in KW.	Size of Fuse in Amperes			
	Single Phase	Open Delta		Closed Delta
		Outside Leads	Middle Lead	
1	1	1	1	1
2½	1	1	1	1
5	1	1	1	1
7½	1	1	2	2
10	2	2	2	2
15	2	2	3	3
20	3	3	3	5
25	3	3	5	5
30	3	5	5	8
50	8	8	10	12
75	10	10	12	15
100	15	15	15	20

E 30.2


TRANSFORMER HANGING
11,000 VOLT CUT OUT BOXES
These boxes are of four styles, the differences between same being in the location of inlets and the hinging of the doors.
STYLE 1
STYLE 2
STYLE 3
STYLE 4
E 40.2

per cent overload. It will be noted that the middle lead of the open delta banks is sometimes fused slightly higher than the outside leads. This is done in order that outside fuses will blow first on overload, thus completely cutting out a transformer rather than leaving two in series across the line.

E 40.1: Sketches for Hanging. The sketches shown apply to single phase 2300 or 11,000 volt transformers of 50 k.v.a. or less, and open delta banks of 30 k.v.a. or less. For banks of larger transformers two-pole transformer racks are built. These are known as Class A or B substations; the former has a 10 ft. x 20 ft. platform surrounded by a railing for the convenience of trouble men, while the latter contains footboards only.

E 40: Transformer Arm Positions.

The following gives the spacing of transformer arms in connection with standard spacing of primary and secondary arms:

2300 and 440 Volt Primary

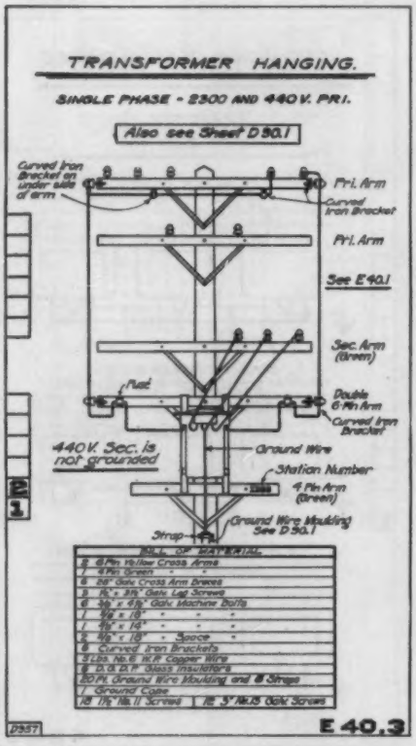
One secondary and two primary arms on transformer pole—On 40 ft. poles the transformer arm is placed 2 ft. below the secondary arm. On 35 ft. poles transformers are hung directly on the secondary arm instead of on a separate arm. On 45 ft. poles and over the transformers arm is placed 6 ft. below secondary arm.

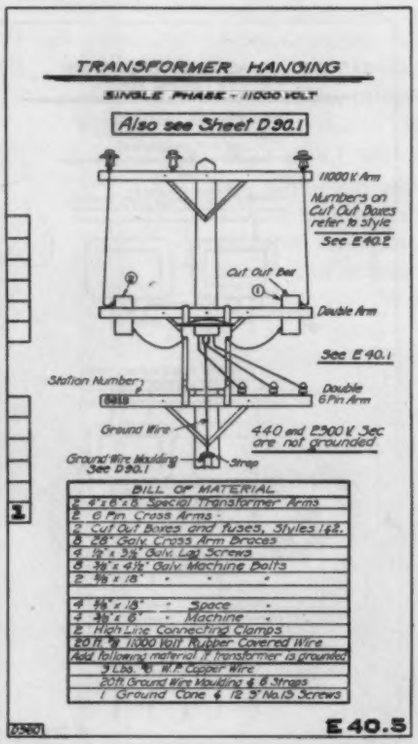
One secondary arm and one primary arm on transformer pole—On 40 ft. poles the transformer arm is placed 4 ft. below the secondary arm. On 35 ft. poles the transformer arm is placed 2 ft. below the secondary arm. On 45 ft. poles and over the transformer arm is placed 6 ft. below the secondary arm.

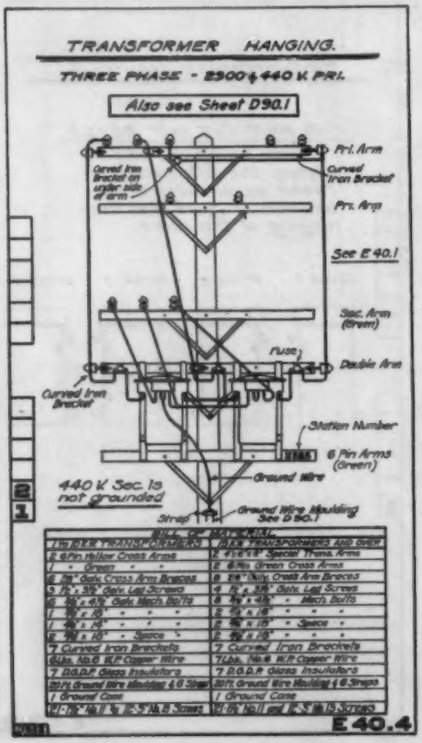
11,000 Volt Primary.

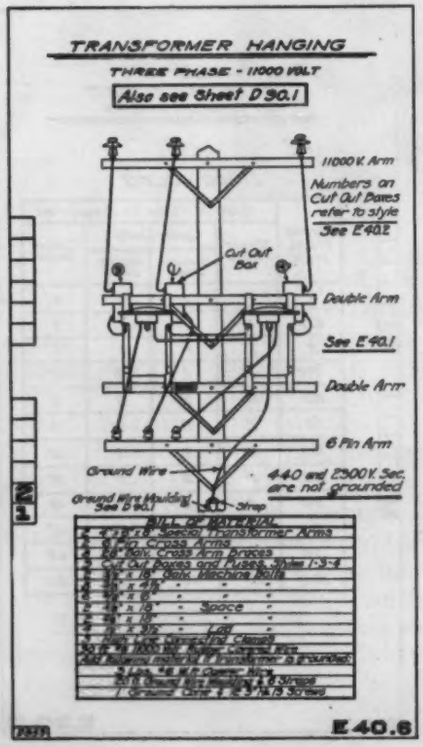
On 40 ft. poles the transformer arms are placed 4 ft. below the 11,000 volt arm; on 45 ft. poles, 7 ft.; and on 50 ft. poles, 10 ft.

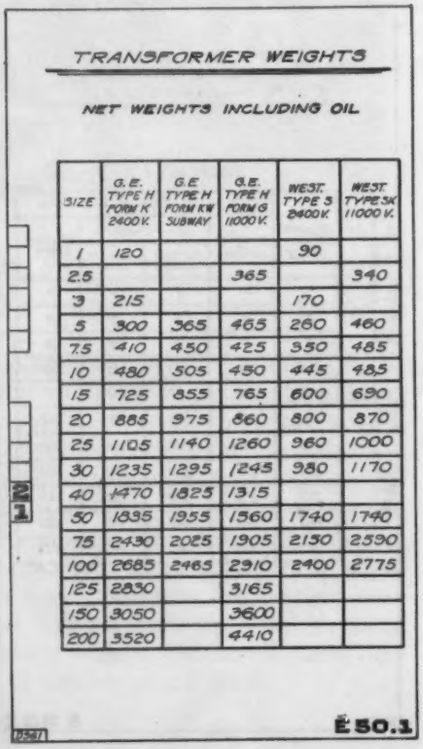
The notes on transformer hanging do not represent hard and fast rules. The construction foreman will use his best judgment to secure the best results, but where no distinct benefit will be derived by deviation from these rules, then they should be followed exactly.


TRANSFORMER HANGING.
SINGLE PHASE - 2300 AND 440 V. PRI.
Also see Sheet D 90.1
Curved Iron Bracket on under side of arm
Pri. Arm
Curved Iron Bracket
Pri. Arm
See E 40.1
Sec. Arm (Green)
Fuse
Double 6 Pin Arm
Curved Iron Bracket
440 V. Sec. is not grounded
Ground Wire
Station Number
4 Pin Arm (Green)
Ground Wire Moulding See D 90.1
Strap
BILL OF MATERIAL
2 6 Pin Yellow Cross Arms
1 4 Pin Green " "
6 28" Galv. Cross Arm Braces
3 ⅞ x 3½" Galv. Lag Screws
6 ⅝ x 4½" Galv. Machine Bolts
1 ⅝ x 10" " "
1 ⅝ x 14" " "
2 ⅝ x 18" " Spacer "
6 Curved Iron Brackets
5 Lbs. No. 6 W.P. Copper Wire
6 D.O.P. Glass Insulators
20 Ft. Ground Wire Moulding and 6 Straps
1 Ground Cone
18 1½" No. 11 Screws
12 3" No. 15 Galv. Screws
E 40.3


TRANSFORMER HANGING
SINGLE PHASE - 11000 VOLT
Also see Sheet D 90.1
11000 V. Arm
Numbers on Cut Out Boxes refer to style
See E 40.2
Cut Out Bar
Double Arm
See E 40.1
Station Number
Double 6 Pin Arm
Ground Wire
440 and 2300 V. Sec. are not grounded
Ground Wire Moulding See D 90.1
Strap
BILL OF MATERIAL
2 4'6" x 6" Special Transformer Arms
2 6 Pin Cross Arms
Cut Out Boxes and Fuses, Styles 1 & 2
2 28" Galv. Cross Arm Braces
4 ⅞ x 3½" Galv. Lag Screws
5 ⅝ x 4½" Galv. Machine Bolts
2 ⅝ x 18" " "
4 ⅝ x 18" " Space "
2 ⅝ x 6" " Machine "
2 High Line Connecting Clamps
20 Ft. #4 11000 Volt Rubber Covered Wire
Add following material if Transformer is grounded
3 Lbs. #6 W.P. Copper Wire
20 Ft. Ground Wire Moulding & 6 Straps
1 Ground Cone & 12 3" No. 15 Screws
E 40.5







SIZE	G.E. TYPE H FORM K 2400 V.	G.E. TYPE H FORM KW SUBWAY	G.E. TYPE H FORM G 11000 V.	WEST. TYPE S 2400 V.	WEST. TYPE SK 11000 V.
1	120			90	
2.5			365		340
3	215			170	
5	300	365	465	260	460
7.5	410	450	425	350	485
10	480	505	450	445	485
15	725	855	765	600	690
20	885	975	860	800	870
25	1105	1140	1260	960	1000
30	1235	1295	1245	980	1170
40	1470	1825	1315		
50	1835	1955	1560	1740	1740
75	2430	2025	1905	2130	2590
100	2685	2465	2910	2400	2775
125	2830		3165		
150	3050		3600		
200	3520		4410		

PUBLIC POLICY OF PUBLIC UTILITY CORPORATIONS

DUPLICATION BY MUNICIPAL UTILITIES.

BY GEO. A. LEE.

(After illustrating the adsurdity of duplicate utilities and the injustice of unregulated municipal competition, the author justifies a rate higher than the banking rate. This paper is a transcript from discussion on F. T. Post's "Public Policy" paper published in these columns September 26, and has not been corrected by Mr. Lee. Mr. Lee was formerly chairman of the Washington Public Service Commission.—The Editor.)

Upon entering the public service commission, I undertook to make an analytical study of the public policy problem from a legal and financial viewpoint. One of the first conclusions I reached was the economic absurdity of a duplication of public utilities, as has been confirmed by several instances in Washington. At Ellensburg a reasonably efficient water system was duplicated by the municipality, at a cost of about $250,000. Ellensburg, as you know, is a small community. Not long ago a similar duplication occurred in Centralia. That duplication is now being agitated in Raymond, South Bend, and other communities.

Now, whether you be layman or lawyer, public utility operator or patron, it is important that you as people of the State stop and consider this situation. It seems to me that in this western community, where we need, more than anything else, the development of our natural resources and the extension of public service power we may well consider and study this problem from an advised viewpoint. Duplication means an absolute waste of capital. If the city of Ellensburg is able to serve a community of thirty thousand and the Public Service Commission requires that it do serve that number, which it has done reasonably and sufficiently, then does it not stand to reason that $200,000 sunk in a duplicate plant means a loss of capital?

In a small community it is impossible for two competing public utility plants to exist. Either there will be a rate war until the two are destroyed, or the one must absorb the other and then boost its rates until the one makes up for the deficiency of the other. There isn't any question about the financial soundness of that argument. Read the expressions of the best courts and commissions in the last twelve months, and you will find that these courts and commissions—regardless of shades of thought and difference in political views, all take the unanimous stand—that the time has come when that condition must stop. If that is true in other states, why can it not be equally true in Washington? Why must the men who put in thousands of dollars, furnishing us with the luxuries of life and waiting until their patronage is big enough to give them a fair return on their investment, be deprived of the benefits? It seems to me a fundamental principle that doesn't require any argument.

It is another subject to teach the people. I think it is time for every public utility man to lay the matter on the table. Their books are open to inspection. They can no longer grab, even if they so desire, and if that is true, with all the elaborate accountings required by the Public Service Commission, it seems to me the public service corporations may approach their legislature and ask them to consider the enactment of some such protective legislation as has been suggested.

There is another matter upon which reasonable men may differ, and that is the question of regulation and control of municipal utilities. I believe—as do others, that it is unjust and unreasonable. As Mr. Post has so admirably expressed, it is unfair and unreasonable to permit indiscriminate freedom to municipal utilities and then deny it to others.

The constitution of this state guarantees a certain measure of home-rule, and if the municipalities are entirely free to control their properties, so should the corporations be.

Some time ago the Seattle Telephone Company was giving inadequate service. Some of the patrons approached the Public Service Commission and asked that the rates be raised and the service improved. That is probably the one time on record that such a request has been made to the commission, basing their request on the argument that the rates were inadequate for good service. The commission entered into an extended inquiry, and an appraisal of the telephone company's property, and found that under the schedule fixed for the various branches the company was getting a poor return upon its investment. Therefore, the commission ordered a new schedule of rates which exceeded the maximum rates fixed in the company's contract. The city of Seattle said that was "unlawful." The Supreme Court of the state sustained the commission and held that the police power of the state was paramount to the city, and that when once exercised should control. That finally established the law in this state and jurisdiction with reference to police control. A great many citizens raised a hue and cry against the company and against the commission. These same critics forgot that in many cases in the past, and probably in some future time they will approach this same commission and allege that the minimum rates are too high, and the commission, after investigation, may so find, and you will never hear any criticism. That established conclusively limitations upon that home-rule clause in the constitution.

The law forbids discrimination. It requires uniformity in rates. It imposes many other requirements. A privately owned plant might have come into the city of Spokane (say twenty-five years ago), made an investment of a million dollars, given light and power to the people, and developed eastern Washington. It might have been content to wait many years (during the so-called lean period) before it received a return upon an investment; the period passes and it is about to make a reasonable profit upon its investment; it complies with all the laws, and lays its cards on the table. About that time agitation is started for municipal plants, and what is the result? The municipal plant is built and is not regulated by the same law as the privately owned plant. You must either place them on the same basis or else eliminate

regulation altogether. That is bound to come about within the next five years.

When I was on the commission many of the people who advocated home rule came to the commission and suggested that they intended to ask the legislature to deprive the commission of all control over companies in cities of the first class. We then told them that it would greatly relieve our duties, but that in justice to the oath of office we had taken we could not consent to that program. But, we said, if you will discuss the matter with us we may be able to arrive at some line of demarcation where our ideas may coincide. But they rejected it, and said we will take the matter to the legislature. We said we will also present our side. As a result the movement was defeated.

As business men, as taxpayers, as men not only interested in your own properties but in the matter of this country's welfare, it behooves you to educate yourselves upon this important problem, and transmit your conclusions to those who represent you in the legislature.

In concluding, it occurs to me that it might be of interest for a moment to indicate what I consider a more reasonable tendency upon the part of the court. Some years ago in the famous case of Callington vs. The Turn Pike Company, the Supreme Court of the United States announced that it was not necessary for a public service company to make anything on its investment. The court said if the value of the service was not worth any more to a certain patron that rate might be held to be controlling. I find the state courts, as well as the federal courts have now come to the conclusion that unless a public service corporation is denied the right and privilege of earning a lesser rate than banking rates it constitutes a confiscation. The mere fact that a schedule of rates just escapes the rates of confiscation does not mean that the schedule of rates is inherently correct. A public service commission, sitting upon a given case, might find that if the company were permitted to earn six per cent the property might not be confiscated, yet they might find that 6 per cent was not a reasonable schedule. The commissions of this country ought not, in the language of the Supreme Court of Wisconsin. try to scale down to the very limit the rates of the public service corporations to escape the rates of confiscation. They ought to be given not less than the banking rates of the community. Yesterday, on a case at Newport, it was established that the earnings of the company had fluctuated over the years of 1912-13, and that in case prohibition carries sixteen per cent of the revenue may be wiped out. This is one of the occurrences incident to the operation of a business of this character, and which justifies a higher rate than the banking rates; otherwise, the state will remain undeveloped.

Conversely, when the public service company reaches a point where it is stable in the community, where it can pay all its fixed charges, and make the banking rate upon its investment, then every public utility operator will be willing to accept that lesser rate. But until that time does come and until that patronage has a non-fluctuating policy, incentive for managerial efficiency is destroyed.

PUBLIC ENEMIES.

If you build a line of railway over hills and barren lands,
Giving lucrative employment to about a million hands;
If you cause a score of cities by your right-of-way to rise,
Where there formerly was nothing but some rattlesnakes and flies;
If when bringing kale to others you acquire a little kale,
Then you've surely robbed the peepul and you ought to be in jail.

If by planning and by toiling you have won some wealth and fame,
It will make no odds how squarely you have played your little game;
Your success is proof sufficient that you are a public foe—
You're a soulless malefactor; to the dump you ought to go.
It's a crime for you to prosper where so many others fail;
You have surely robbed the peepul, and you ought to be in jail.

Be a chronic politician, deal in superheated air;
Roast the banks and money barons, there is always safety there;
But to sound the note of business is a crime so mean and base,
That a fellow guilty of it ought to go and hide his face.
Change the builders' song triumphant for the politicians' wail,
Or we'll think you've robbed the peepul and we'll pack you off to jail.

—Walt Mason.

The nitrogen lamp, or gas filled metallic filament lamp as it is now denominated, is available in 200 to 1000 watt sizes at 105 to 125 volts. More than half its luminous flux is of a daylight color. The lamp requires a heavy initial current, approximating twice its steady value for about one-twentieth of a second.

The telescribe is a recent invention of Thomas A. Edison consisting of an Edison dictating machine arranged to record both sides of a telephonic conversation. It should be of particular value to brokers and others conducting important business over the telephone, where a record has heretofore not been possible.

Electric production of ferro-manganese has been started on a large scale in the electric furnaces of the Noble Electric Steel Company at Heroult, Shasta county, Cal., One furnace is in operation with a daily output of 15 tons and other furnaces are being rushed to completion to meet the demand from the steel mills which has ensued since the curtailment of European supply.

Time saved by the Panama Canal, in the case of the "Pleiades" which sailed from San Francisco July 27, and reached New York August 26, amounted to just half that usually occupied in the trip around the Horn. During the past week a vessel arrived in San Francisco Bay from Holland via the Panama Canal in just 31 days. Incidentally it carried a large shipment of tungsten lamps.

Aluminum nitrade is a synthetic substance obtained by the utilization of atmospheric nitrogen, being based on the fact that aluminum can be caused to absorb nitrogen under the influence of an electric current. This process requires one-eighth the current necessary in the Birkland-Eyde process and less than one-half that in the cyananide process to obtain equal weights of "fixed" nitrogen. A French company is making commercial application of this process.

LIGHTING METHODS

ARC LAMP PHOTOMETRY.

BY FORD W. HARRIS.

(After a statement of the difficulties of arc photometry and the causes therefor, the paper gives practical directions and precautions to be used in testing arc lamps. The author is a consulting engineer at Los Angeles.—The Editor.)

A great deal has been written about photometry in general, and about arc lamp photometry in particular, and there are many published distribution curves of particular types of lamps burning particular carbons. To the average engineer familiar only with incandescent lamp photometry these curves are quite convincing and they are generally accepted as correct by those interested. Arc lamp photometry, however, is radically different from incandescent lamp photometry, and any results obtained must be interpreted in the light of these differences. It is the purpose of this paper to point out what these differences are, to explain what must be guarded against in testing arc lamps, and to point out in a broad way the best methods of testing such lamps both in the laboratory and in the field.

In the first place it should be recognized that in dealing with the question of light from an arc lamp we are dealing with a most variable quantity. In testing incandescent lamps under constant voltage conditions we have a constant source of light, and can get accurate results if we understand our business and have a satisfactory photometer. No such accuracy in a single reading is possible in arc lamp testing. The total light emitted from the lamp varies instantaneously over wide limits, and there is superimposed on this total variation instantaneous variations in the shape of the distribution curve, so that the light thrown on a unit surface varies erratically. The eye, due to the natural persistence of vision, tends to integrate these variations and the judgment of the operator may be exercised to strike an average, but the results are generally unsatisfactory. A general average may be found which will probably be correct within 10 per cent for the particular conditions under which the lamp is operating when tested, provided proper precautions are observed.

The light emitted from the lamp, however, will vary widely, quite apart from the instantaneous jumps previously mentioned, during the life of a pair of electrodes, and the average light given by one pair of electrodes may vary widely from another even when these electrodes are commercially identical. This is particularly trueof electrodes depending on titanium or iron for their luminous properties, such as are commonly used in the magnetite or metallic flame lamps. This variation in electrodes can be easily exaggerated if desired in mixing samples, as in such electrodes light is often sacrificed for reliability or life, the electrodes giving a high luminosity being likely to be unsteady, short lived, and often giving trouble due to slagging. It should be borne in mind that any arc is a variable quantity, jumping about for no apparent reason, easily affected by drafts or stray magnetic fields, and that the electrodes, being composite bodies imperfectly mixed, cause instantaneous variation in the material fed into the arc. When the light is thrown on the photometer screen these variations are magnified, and the result is an unsatisfactory series of readings. In addition to all this there is the question of color variation and the human equation which is modified by both the question of the judgment and the peculiarities of vision of the operator.

It is comparatively easy with a good arc lamp photometer to take a set of readings from which a distribution curve can be plotted, and it will not take over an hour to do so with a conveniently arranged photometer. If, however, the electrodes are changed and a second curve is taken the next day by a different operator the chances are that the results will differ both as to the total light and its distribution. It is possible, however, by taking suitable precautions to get close results in arc lamp work and the methods to be employed will now be described. Much of the knowledge acquired in ordinary photometry is applicable to arc lamps, but this will be referred to only briefly and in such a connection as will be necessary to understand the peculiar nature of the arc lamp problem.

As we are dealing with a variable, and all our results are somewhat approximate, it is unnecessary to go to any great refinement in our photometer proper. While the Lummer Brodhun screen is accurate when applied to incandescent lamp testing, it is really unnecessarily so when applied to arc lamp testing, and it is probable that an ordinary Bunsen grease spot will serve the purpose quite as well. The standard lamp should of course be accurate, and it is best to use it only for checking secondary standards which are used for the actual testing. The supply voltage for the standard lamp must be steady, preferably being furnished by adequate storage batteries in good repair.

In an arc lamp, and in general in any luminous source, we desire to know both the total light and its distribution.

My method of testing lamps is to determine as accurately as possible the shape of the distribution curve quite apart from the luminous intensity, then to determine the intensity at a certain angle, and finally to find the average total light over a long period.

The shape of the distribution curve can best be worked out in a distribution photometer in which a fixed screen is placed in a certain relation to the lamp to be tested, and the position of the standard lamp with relation to the screen varied until a balance is struck. The screen is shielded from the direct rays of the arc and a pair of mirrors are turned to the various angles desired. Such a photometer is shown in Fig. 1. In these figures the arc lamp is hung from a suitable support. A pivoted arm is provided with adjustable mirrors and turns about a shaft carried on the same support. This shaft is on the photometric

axis which passes through the arc, and upon which the sight box and the standard lamp are also placed. A metal disc, having a plurality of holes about its outer edge, is also secured to the main support, these holes being preferably every ten degrees apart, and so placed that they are entered by pins sliding in the ends of the arms, and by which the arms may be secured in any angular position. A screen is hung alongside the arc lamp to screen the sight box from the direct rays from the lamp.

The photometer proper consists of a table having metal strips secured thereto and forming the track for a truck which carries the standard lamp and a recording magnet, the lamp and magnet being fed through a flexible cord. A handwheel is provided which pulls the truck back and forth by means of a cord which passes over suitable pulleys and connects to either end of the truck. A soft wooden roller is mounted in suitable bearings on the table and is turned by a handwheel. A sight box is placed on the table in the photometric axis.

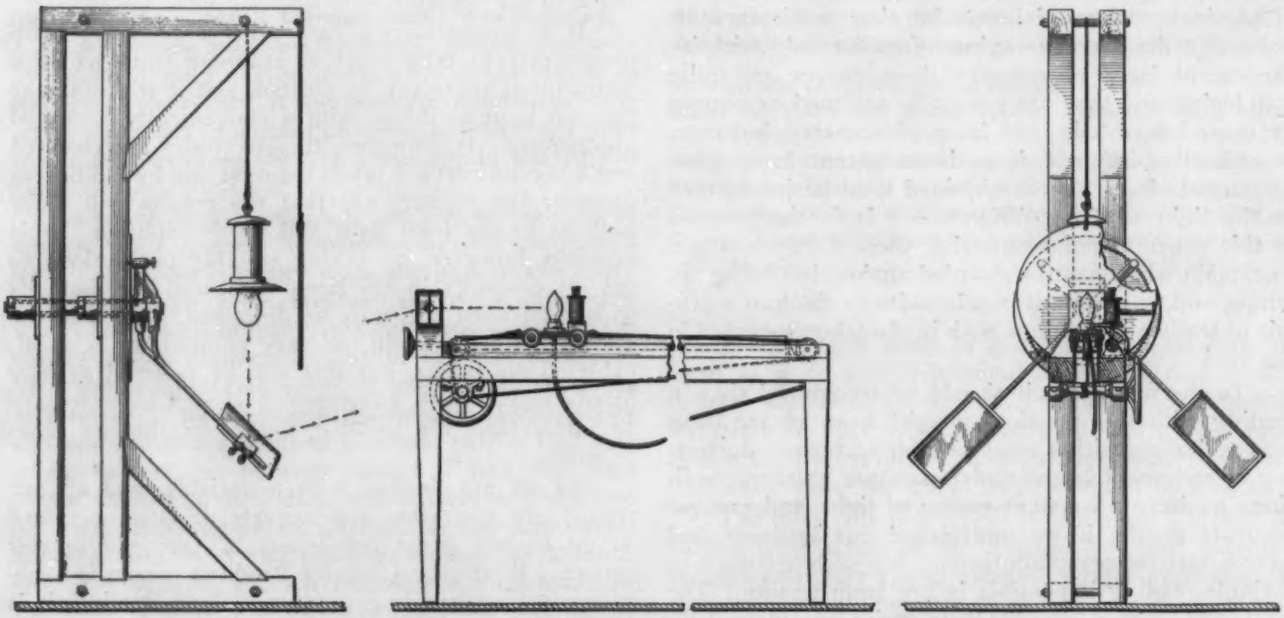


Fig. 1. Arc Lamp Photometer.

This photometer is designed to give a series of quick readings, a scale being marked on one of the metal strips. The method of using is as follows: The parts being assembled as shown a strip of paper is secured about the roller by thumb tacks. The operator then sets his mirrors for the angle he wishes to get his reading on and slides the standard back and forth until he gets a balance in the sight box. At the instant he does this he closes the circuit, by a small switch not shown, to the magnet, and a pointed core is pulled down and punches a hole in the paper. He then opens the circuit and the core is thrown up by a spring. The operator then gives the handwheel a turn, destroying his balance and proceeds to establish another, recording it when obtained on the strip of paper as before. About ten readings should be taken before the mirror are shifted to another angular position. The result will be ten dots in a straight line on the paper. The angle read is then marked on this line and the roller is turned and a second set of readings is taken. This procedure is followed until ten readings are taken at each angle. The center of each set of ten is then determined and this may be considered as a mean. At least ten such means should be determined and the average used to plot a distribution curve in any convenient units.

Ordinarily in photometric work care is taken in calibrating the apparatus to determine the exact quantity of illumination at each point. In finding the shape of the distribution curve this is not necessary, as relative valves are all we want. The standard lamp may be of any convenient candlepower.

It is now necessary to determine the total light and this is best done in a sphere such as is illustrated in Fig. 2. The lamps are preferably hung on arms, mounted on an axis, six lamps being preferably employed so connected that they can all be burned continuously, any one of them swung into the sphere for a reading. This sphere is formed of two halves like a walnut shell, and has an opening in the top adapted to fit tightly around the lamp casing. This is desirable in testing lamps that give off fumes, as these fumes deposit inside the sphere and destroy its accuracy, unless the chimneys are placed outside. A standard incandescent lamp is placed at any convenient location inside the sphere, and a opening is made in one side thereof through which light is admitted to the photometer. The observer takes readings through the sight tube, the photometer being the standard Sharp-Millar instrument. Various lamps may be compared by such a sphere and close results obtained, the readings being proportional to the total light emitted from the lamp. If such a sphere is considered too expensive, good average results may be obtained in a cube if the corners are filled. The spheres are, however, not very expen-

sive and quite satisfactory. Having obtained the shape of the distribution curve in arbitrary units in the distribution photometer and the total light in the sphere, it is possible, by the use of the Rousseau diagram, to derive an accurate distribution curve from these data.

A preferable way to get such accurate distribution curves, however, is to remove the mirrors and the plate from the distribution photometer and take direct horizontal readings on the arc, determining the average horizontal candle power of one hundred or more readings taken throughout the life of a pair of electrodes. If the horizontal candle power is known and the shape of the curve is known an accurate curve can be readily plotted.

In practice, however valuable the above data may be to the lamp designer, it is of questionable practical value to the user of arc lamps. The real points of merit of an arc lamp can be much more easily deter-

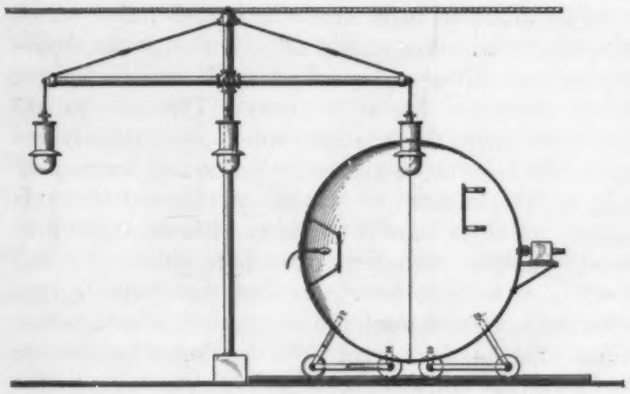


Fig. 2. Sphere for Determining Total Light.

mined by one interested. The two points most interesting to a user is the light emitted at an angle of 15 degrees below the horizontal and the shadows cast. The question of shadows can best be determined by hanging several lamps over plane, evenly-colored surfaces and observing the results. That lamp is the best which throws no shadows, and no amount of distribution curves can effect a practical demonstration of this kind. The light at 15 degrees below the horizontal can be fairly and accurately determined by hanging the lamp in a dark room and setting the Sharp-Millar so that a 15 degree ray is intercepted. One hundred or more readings should be taken and an average struck. If the lamps are hung low 10 degrees may be of more importance and readings may be taken at this value.

The candle power of arc lamps is regularly overestimated by the manufacturers. The ordinary 7 amp. a.c. enclosed arc burning under average conditions gives a maximum of about 300 c.p.; the 4 amp. magnetite between 450 and 600 c.p.; the 6.6 amp. magnetite from 800 to 1200 c.p. depending on the electrodes. The new enclosed impregnated carbon lamps give from 1000 to 3000 c.p. at this angle with 10 amps. 55 volts at the arc again depending on the particular make of carbon and the character of the circuit. It is no secret that the ordinary enclosed a.c. arc is obsolete as a light-giving source and ought to be scrapped. The 4 ampere magnetite is at present the most practical arc lamp for residence street lighting, and the luminous flame or impregnated carbon arc the most practical for display or business street lighting. It is probable, however, that unless rapid improvements are made in arc lamps that the new nitrogen filled tungstens will largely supersede them.

NITRATES MAY BE PRODUCED IN UNITED STATES.

The European situation has called attention sharply to the dependence of this country upon Germany for its potash supply, some 12 or more million dollars' worth of which is used annually in the United States for fertilizer. Another necessary mineral fertilizer for which the United States is entirely dependent upon a foreign country is sodium nitrate, over 21 million dollars' worth of which was imported from Chile last year.

Deposits of sodium and potassium nitrate are known in Utah, Nevada, California, Oregon, Montana, and New Mexico, and have been described in publications of the Geological Survey and Bureau of Soils, but thus far no material of this kind has been found in sufficient quantity to promise commercial value. The latest report that has come to the Geological Survey relates to a deposit in Arizona.

One important domestic source of combined nitrogen is the gas works and by-product coke ovens, which in 1912 reported a recovery of ammoniacal liquor, ammonia, and ammonium sulphate valued at $9,519,268. This output of by-product ammonium sulphate increased in 10 years from 17,643,507 pounds to 99,070,777 pounds, and as it is linked with the great coking industry further increases can be expected.

Another domestic supply of nitrogen compounds lies in the fixation of atmospheric nitrogen by electricity. Cheap hydroelectric development is necessary to establish this industry, which would make our large agricultural and industrial interests free from the uncertainties of the foreign supply. It is hoped that the water power legislation now before the United States Senate may promote hydroelectric development in large units and thus utilize some of the great water powers in the West in obtaining nitrogen from the air.

Steam boiler explosions in the United States during the year 1913, totalled 499; 180 persons were killed and 369 injured. Every engineer or other worker in a steam power plant who prizes his life should insist on the use of softened water for his boiler, and on its periodical inspection and cleaning.

Phosphates in Idaho is the subject of a recent bulletin from the U. S. Geological Survey. An estimate of the high-grade phosphate rock available in the area northeast of Georgetown is 2,663,290,000 long tons. Positive information about the character of the deposits at greater depth is needed, since all the data collected at present have come practically from the outcrop. The importance of the phosphate deposits still in public ownership is greatly enhanced by this estimate, even if only the outcrop of these deposits is of present commercial value. It is considered advisable, however, that a study of the quality of the deposits lower down should be made by systematic drilling prior to their disposal and development.

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Successful Municipal Ownership

San Francisco has good reason to be proud of the municipal electric railway system described in this issue. Built to meet an urgent demand for service which could not be supplied by private capital because of prohibitive restrictions, the system stands as a monument to the efficiency of the engineering department of the city.

These railway lines were needed to provide adequate transportation to the Exposition, whose success was largely dependent upon their immediate construction. Private capital could not or would not, build them. So it became a duty for the municipality to assume the responsibility, quite apart from any direct profit or benefit which have fortuitously resulted because of their strategic position along present trade arteries.

One criterion in determining the limits to which municipal ownership should be extended is the indispensability of the utility, whether it can be spared in the economic life of the city. The city should own and control those factors which are vitally essential to the lives of its citizens. Police and fire protection, sewers, streets and schools come under this category. As cities become larger and life more complex former luxuries become actual necessities. In fact civilization is largely a process of transforming luxuries into conveniences and conveniences into necessities. The luxuries have been developed by specialized technical knowledge and private capital. As the knowledge becomes more general and the requisite skill becomes less, it is possible for less specialized organizations to carry on the work.

Urban transportation in Western communities is in the twilight zone between the indispensable and the dispensable utility. Modern city life is not possible without water, and consequently a water system is indispensable. Candles or lamps are a possible substitute for gas or electric lighting, so they may be classified as dispensable. While walking or bus service is possible in case the street cars fail to run, the larger the city the more unsatisfactory the substitute. Therefore ownership of a street railway may now be logically considered a proper function of a large city. By inference, also, the continued development of gas and electric lighting makes it merely a matter of time until they will become so indispensable to our life as to make municipal ownership advisable. Such a millenium, however, has not yet arrived.

This editorial is calculated to be a fair and unbiased statement of the eventual. But while an enterprising manufacturer of flour has given wide publicity to the slogan "eventually—why not now?" there are many good reasons for not treading too closely upon the heels of progress. Electrical development is still too highly specialized to be yet safely placed in the hands of amateurs.

Nor does municipal ownership necessarily mean municipal operation. It is difficult, for instance, to

assure the continuance of such integrity of management as has characterized the construction of San Francisco's municipal railway. "To the victors belong the spoils" is always the motto of politicians. Too often do government office-holders adopt the mental attitude that they have worked hard enough to get their job and been put to such an expense, that they consequently have little incentive to give proper service to the public who employs them.

For several years this journal has consistently recognized that municipal ownership of public utilities is inevitable and has as constantly urged that private operation is advisable. Better service can be given at lower rates under the efficient management of a private operating company than by any political system yet devised.

At this time also a word of warning should be incorporated with the commendation of San Francisco's enterprise. There is every likelihood that the property of the United Railways will be acquired by the municipality sooner or later. This company's enforced policy of limiting unprofitable extensions, has roused the antagonism of many real estate speculators who will be the first to urge expansion of a politically controlled street railways system. Unless these extensions be made with great care and judgment, profits will be transposed to deficits. While these remarks are specific in illustration they are general in application.

Simpler Symbols

Electrical men are a unit in recognizing the need for a wider popular understanding of the how and why of electricity and its application. Most discussions regarding electrical subjects are couched in language which the layman does not understand. To correct this undesirable state of affairs two alternatives are open. One is to continue to patiently educate the public about the meaning of electrical terms; the other is to translate these electrical terms into the every day language of the average man. While there is great need for educating the public about electricity there is a greater need for educating the electrical engineer about simpler means of expressing his ideas.

Most of the facts and theories of electricity can be stated in language so simple that a child can understand them. Just as the clown must be the smartest man in the circus, so is the simple writer or lecturer the man who best knows his subject. The books that have lived through the ages are the books within the understanding of the people.

Because electrical facts and theories were first developed largely by the aid of mathematics a scientist seldom has the daring originality to depart from the mathematical formalism which has thus become intimately associated with electricity. Few men understand the intricacies of higher mathematics. What a man can not understand he is likely to fear. So men are suspicious and fearful of electrical facts expressed in mathematical terms.

This in no measure is intended to discount the value of mathematics in the study of electricity. Without the aid of this powerful tool present day knowledge would not have been possible, but its future use requires brains and not the mere mechanical ability of an automaton.

At last the mathematicians themselves are beginning to recognize that the calculus, for example, is a mass of meaningless letters and formulae to the average student largely because the teachers have slavishly clung to the abstract and conventional treatment which commonly divorces the subject from commonsense and everyday experience. They have endeavored to made mathematics the end, rather than the means to an end, and in so doing have defeated their own purpose.

A recent meeting of the Society for the Promotion of Engineering Education was deeply concerned with this problem. A strong appeal was made for a better realization of the physical reality which a mathematical process symbolizes. A differential is not merely a symbol of operation, but a definite, concrete geometrical magnitude, the tangent of an angle. In physical experience it represents a rate of change. Professor Hedrick of the University of Missouri stated many of the results of the calculus in a form which requires no previous mathematical training and employs no symbols except English words, all based on this conception of rate of change, whether of time, temperature or any other basal factor.

Now that such an example has been set, it is high time for electrical engineers to do likewise. The ability to use mathematical short-hand in their own studies should not prevent an interpretation for the benefit of others.

What this world needs, above all else, are interpreters. Since the time that Joseph interpreted the dreams of a Pharoah until Steinmetz interpreted his own visions, interpretation has ever been rewarded as the highest type of electric service. Any systematic effort to educate the people about electrical matters should be preceded by and based upon a simplification of electrical terms. This is a work which calls for the attention of the biggest brains in the industry.

The usual electrical text book consists largely of symbols. Symbols have always been used since the earliest times to transmit ideas. The truths of the ancient mysteries were communicated to the initiated and concealed from the uninitiated by means of symbols. Thus a symbol usually embodies as much concealment as revealment. In ancient times ignorant people worshiped the symbol, rather than the principle symbolized. In modern times we have an idolatry of mathematics, rather than of the physical ideas which mathematics symbolizes. Let us therefore simplify our symbols.

PERSONALS

G. C. Green, manager Fairbanks, Morse & Co. at San Francisco, is making a trip throughout the San Joaquin Valley.

Eldon Beal, superintendent of construction for the Northwestern Electric Company, of Portland, Ore., is at San Francisco.

W. D. Gilroy, has succeeded **S. L. Cook,** resigned, as manager of the Kootenay Lines, Ltd., the telephone company at Nelson, B. C.

H. V. Carter, president Pacific States Electric Company, San Francisco, left for a trip to Portland and the Northwest the first of the week.

A. J. Myers, Pacific Coast manager Wagner Electric Manufacturing Company, is making a business trip throughout the southern part of California.

A. V. Olsen, representative Pass & Seymour, at San Francisco, has returned from a short pleasure trip throughout the San Joaquin Valley.

John P. Coughlan, attorney for the Pacific Gas & Electric Company at San Francisco, has been appointed receiver for the Northern Electric Railway.

G. H. Moore, electrical engineer with the city engineer's office at Seattle, is directing surveys of power sites in the Olympic Mountains, Washington.

William Strohman, eastern representative Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., is a recent arrival at San Francisco.

C. F. Conn, assistant Pacific Coast manager J. G. White Engineering Corporation, has left San Francisco for the East on business, where he expects to stay about three weeks.

R. H. Gaud, manager of the electric lighting and transportation interests of the Southern California Edison company at Santa Barbara is a recent visitor in San Francisco.

J. H. McCarthy, formerly with the Electric Appliance Company, has recently joined the forces of the Electric Railway & Manufacturing Supply Company of San Francisco.

Ira J. Francis, manager of the Southern California branch of the John A. Roebling Sons Co., has returned to Los Angeles from a trip to the Trenton factory by the way of the Panama Canal.

S. Z. Mitchell, president Electric Bond & Share Company, is in Salt Lake City in connection with the business of transferring the property of the Utah Light & Railway Company to the Utah Light & Traction Company.

W. M. Carpenter, vice-president and general manager American Cross-Arm Company of Chicago, is a recent business visitor in San Francisco. He leaves for Los Angeles where he expects to stay for a week or ten days before returning to Chicago.

H. H. Cudmore, director of the Mazda Bureau of General Electric Company, expects to leave San Francisco this week for the East, attending the annual congress of the Jovian Order at St. Louis enroute. He plans to return about the first of November.

E. F. Dunlap, electrical inspector at Portland, has returned from an extensive western trip in the course of which he examined the requirements for electrical wiring at Seattle, Tacoma, Spokane, Minneapolis, St. Paul, Chicago, Kansas City and Denver.

D. W. Henderson, superintendent of transportation, and **E. A. Batwell,** publicity agent for the Puget Sound Traction, Light & Power Company, have left Seattle to attend the annual convention of the American Electric Railway Association at Atlantic City.

L. E. Hanchett was re-elected chairman of the board at the annual meeting of the stockholders of the Northern Electric Railway, also **Leon Sloss,** president; **P. T. Morgan, J. D. McKee, J. S. Drum, Louis Sloss** and **W. P. Hammon** were re-elected as directors.

W. L. Overman, special representative of the Hughes Electric Heating Company of Chicago, Ill., has an exhibit at the Alameda County Exhibition and Carnival at Idora Park in Oakland, with the Piedmont Electric Company, demonstrating electric heating devices.

C. N. Black, vice-president and general manager United Railroads of San Francisco has left for Atlantic City to attend the annual convention of the American Electric Railways Association of which he is president. The 1915 convention will be held in San Francisco.

K. E. Van Kuran, assistant district manager of the Southern California office of the Westinghouse Electric & Manufacturing Company, has returned from a trip East, during which he attended the managers' convention at Hot Springs and visited the factories at Pittsburgh.

D. E. White has been transferred from the Pittsburg office of the Westinghouse Electric & Manufacturing Company to act as railway specialist at the Seattle office, succeeding **K. A. Schaller,** who recently resigned to become superintendent of the St. Paul & Southern Railway.

Philip Hamlin has resigned as vice-president of the Mountain States Telephone Company, Denver, Colorado to take charge of the Interstate Utilities Company which has absorbed the North Idaho Telephone Company and other telephone interests in northern Idaho. Offices will be maintained at Spokane.

W. S. Heger, Jr., who left for St. Louis last month to be present at the assembling and tests of the great engine the Busch-Sulzer Bros. Diesel Engine Company are to install at the Panama-Pacific Exposition, has returned to San Francisco and reports that the tests were a great success, and that the factory is running day and night.

J. G. Barber was elected president of the Yosemite Power Company at the recent annual meeting held in San Francisco. The company has been reorganized and the new officers are: **F. G. Hamilton,** first vice-persident; **E. A. Wiltsee,** second vice-president; **P. M. Langan,** treasurer and controller —directors, the foregoing and **Albert Raymond.**

Henry Bosch Jr. has resigned as chief draughtsman for the department of electrical and mechanical engineering of the Panama-Pacific International Exposition to join the engineering department of the Pacific Gas & Electric Company at San Francisco, under **J. P. Jollyman,** engineer of electrical construction. Mr. Bosch was with the Exposition from the time of the inception of the electrical and mechanical department until the present, a period of over two years. He was the author of an article regarding the electric conduit system of the Exposition published in this journal of July 7, 1913, and was responsible for many details of design which are now materialized in the finished construction.

MEETING NOTICES.

Los Angeles Section of the Electric Vehicle Association of America.

The first regular meeting of the season will take place on Wednesday evening, October 7, at the Jonathan Club, Los Angeles. After dinner the social and business conditions will be discussed and several papers be presented.

Southern California Section of the A. I. E. E.

Chairman Deacon Pyle makes the announcement that the first meeting of the season will be in the form of an excursion to the recently completed Kern River plant of the Pacific Light & Power Company, on Saturday, October 10. Special trains will convey the members to the plant, which will be described by Mr. Woodbury and his assistants.

Oregon Society Engineers Luncheon.

The first weekly luncheon of the Oregon Society of Engineers was held in the Crystal dining room of the Benson

hotel at 12:10 p. m., September 28th, with an attendance of 80 members and their invited guests. Mr. W. B. D. Dodson, trade commissioner of the Portland Commercial Club was the speaker of the day. He made a strong plea for engineering assistance in foreign trade expansion.

It is intended to make this a permanent affair and the speaker for the next luncheon is Mr. W. D. Wheelwright, president Pacific Export Lumber Company, who has recently returned from Europe and he will speak on the war situation. All members of other technical societies are invited to meet with the Oregon Society of Engineers at these luncheons.

Utah Electric Club.

The Utah Electric Club resumed their regular weekly luncheons at the Commercial Club, Salt Lake City on Thursday, October 1st. Captain W. G. Webb of the Utah Battery talked on the subject "Modern Artillery Practice," illustrating his talk with samples of the various kinds of shells used in the artillery branch of the service. Stanley S. Stevens, presided as chairman for the month of October. During the winter season the Utah Electric Club will hold luncheons every Thursday at 12:30 at the Commercial Club and all visiting members of the electrical fraternity are cordially invited to attend. W. W. Torrence, local manager of the General Electric Company is president and Bayard W. Mendenhall, commercial agent of the Utah Light & Traction Company is secretary.

Electrical Development and Jovian League.

September 6th was Jovian Day at the League. The speaker of the day was Mr. Robert L. Eltringham, safety engineer of the Industrial Accident Commission of California, who told most interestingly of the work being carried on by the Commission and stated the world was commencing to realize that the people who are producing the wealth of the world are entitled to some form of recognition for their services and are entitled to all possible protection. It is in furtherance of this object that the "Safety First" slogan and movement come into existence.

The speaker was followed by Mr. Brownell, "Superintendent of Safety" of the Commission, who also gave some interesting figures and experiences. The meeting, presided over by President Heise, who also tendered some remarks on the subject, closed by a vote of thanks to the speakers.

Joint Pole Commission, Portland, Oregon.

H.R. Wakeman, superintendent of lines and conduits of the Portland Railway, Light & Power Company has been elected president of the Joint Pole Commission. A joint pole agreement has been formally signed by the Portland Railway, Light & Power Company, the Northwestern Electric Company, the Pacific Telephone & Telegraph Company, and the Home Telephone Company. No secretary has been as yet appointed. The expenses are to be borne jointly.

In July of 1913, Mr. F. D. Weber, electrical inspector of the Underwriters' Equitable Rating Bureau, suggested to the Oregon Society of Engineers the necessity of creating a joint pole commission for the city of Portland. This suggestion was acted upon by the society and Mr. Weber was appointed chairman of a committee to get this matter considered by the utilities interested.

After several meetings of the committee, the city of Portland passed an ordinance, No. 27,786, "Empowering the Commissioner of Public Utilities to devise plans for the elimination of poles and overhead wires from the streets."

At a public hearing held at the city hall, on this ordinance, after its passage, a new committee was formed with wider scope and Mr. O. B. Coldwell, superintendent of power and light, was appointed chairman. This new committee finished its labors in January, 1914, and now the companies have formally accepted this agreement.

Jovian Electrical League of Southern California.

The weekly luncheon of the league, held at Christopher's, Los Angeles, on Wednesday, September 30, presided over by F. Menominee Sinsabaugh, was attended by about 120 Jovians and a number of guests, who cheered enthusiastically when it was announced that Statesman Colkitt had recently become the father of a little Miss Colkitt. As a token of his appreciation, Papa Colkitt passed the cigars around in person. Stentor Pieper had provided a splendid musical program, which was followed by a very interesting talk by Dr. C. L. Edwards, on the remarkable journey into the Klamath forest by Joe Knowles. As Dr. Edwards accompanied Mr. Knowles as the accredited representative of a newspaper, and had carefully recorded his activities and experiences, the story was listened to with intense interest. He described Mr. Knowles as a most accomplished nature student and artist, whose powers of endurance were due largely to Indian blood which ran through his veins. Knowles entered the forest without tools, clothing and food, and the speaker explained how the man, in primitive fashion, procured his food, his clothing and his fire, illustrating the latter by the use of the actual implements. He showed how ground squirrel and trout were caught, how dandelion and hearts of fern were made into salads and how, without paints and brushes, a beautiful picture was produced by this "primitive" man alone in the vastness of the mountains. The speaker exhibited this picture made on birch bark, as well as the poetic messages left behind for those who acted as witnesses of this interesting and novel expedition.

THIRTY-FIFTH ANNIVERSARY OF ELECTRIC LIGHTING.

Wednesday, October 21, this year, will commemorate the thirty-fifth anniversary of the invention of the electric incandescent lamp by Thomas A. Edison. This day in 1879 may be said, broadly speaking, to mark the birth of electric lighting. Certainly it marked the birth of the general and popular use of electric lamps. Arc lamps had been in use some years previous to this time, but only a few of these were then employed for searchlights, to light theaters, parks, street corners and similar public places. The universal lighting of both public buildings of all kinds as well as private dwellings by electricity through small units became a dream realized only when Edison first sucessfully made his electric filament bulb glow in his laboratory at Menlo Park, N. J., thirty-five years ago.

So great have been the benefits to mankind from the general employment of electric illumination that Edison may well be acclaimed not only one of the world's most wonderful inventors, but also one of her greatest humanitarians. It is therefore an entirely fitting tribute to the genius of the man that the twenty-first of October this year should be celebrated both by the industrial world and the general public as a national anniversary. It is particularly appropriate that this day, which will be known as "Edison Day," should be observed at this time in this country as a signal example of the triumph or peaceful constructive achievement in contrast with the present colossal destructive movements against civilization and her pursuits in the Old World.

Many local campaigns of lighting companies that has already been started will culminate on Edison Day. Some companies intend to show their appreciation of Edison's achievements by various novel features, such as stopping the street cars for half a minute at high noon on October 21st, and by offering special inducements to non-users of electric service to begin its use at that time. Strong effort will be made to present the desirability of replacing inefficient carbon lamps with the modern efficient Edison Mazda lamps. The campaign will afford lighting companies the opportunity to combine all their separate campaigns, such as house-wiring, sign-lighting, high efficiency lamps, etc., into one great effort. The thousand-watt high efficiency gas-filled Mazda lamp will be exhibited by many as an example of the tremendous progress that has been made in electric lighting in the last thirty-five years. This lamp now gives relatively twelve times as much candlepower per watt as Edison's earlier lamps.

NEWS OF CALIFORNIA RAILROAD COMMISSION.

The commission has rendered a decision authorizing the Union Home Telephone & Telegraph Company to issue $22,700 of promissory notes to be used in refunding other notes outstanding.

The commission has issued an order to the Lindsay Home Telephone & Telegraph Company, granting it an extension of time to March 31, 1915, in which to issue a note or notes in the sum of $2000.

The commission has rendered a decision authorizing the Pacific Light & Power Corporation to issue $170,000 face value of its first and refunding bonds to be used in complying with the sinking fund provisions of its trust deed.

The commission has rendered a decision granting the Sausalito Incline Railway Company a certificate of public convenience and necessity to operate an incline railway in the town of Sausalito, Marin county. The company is also authorized to issue $15,000 preferred or common stock for the acquisition of right of way and other real property; $2500 of preferred stock to Dr. Allen H. Vance for promotion services and $500 of preferred or common stock to complete final plans for the construction of the road.

The commission has rendered a decision authorizing the Pacific Light & Power Corporation to issue 19,430 shares of its first preferred 6 per cent cumulative stock at not less than $85 per share, and $4,382,000 of first and refunding mortgage bonds at not less than 85 and accrued interest, with the provision that the bond issue shall be made subsequent to the stock issue. It is further provided that the company shall only issue the bonds when it shall have complied with the provisions of the deed of trust to the United States Mortgage & Trust Company.

The commission has rendered a decision authorizing the Consolidated Securities Company to sell its telephone system in the City of San Fernando, Los Angeles county, to the San Fernando Telephone & Telegraph Company. In return, the telephone company was authorized to issue a promissory note in the sum of $20,000 bearing interest at 6 per cent per annum—the principal payable in installments over a period of 20 years. The telephone company is also authorized to issue $10,000 par value of its capital stock to be sold for not less than par and to be used for additions and betterments to its system. The authorization of the transfer of property will not become effective until the aforementioned $10,000 of stock has been sold.

NEWS OF WASHINGTON PUBLIC SERVICE COMMISSION.

The commission has issued orders permitting the Puget Sound Traction, Light & Power Company to furnish free light-the service to the state fish exhibit, to issue L. S. N. rates for lights for theatres, and public markets in Seattle, as well as vacation rates for schools.

The case of H. J. Palmer vs. Northwestern Electric & Water Company, was dismissed, as it had been settled by stipulation.

The rate complaint of the City of Spokane against the Washington Water Power Company was dismissed upon petition of complainant.

The rates of the Cowiche Telephone Company have been found to be reasonable. In the valuation of this company the following decision has been reached: Cost of reproduction, new, $11,708; less depreciation, $70,005; operating expenses, $2838; revenue, $2923. Fair value found, $9300.

The following dates have been set for hearing:

October 9, 9:30 A. M.—Seattle, Commission ex rel. B. Weiman vs. Richmond Beach Telephone & Power Company. Service.

October 14, 9:30 A. M.—Port Townsend, Commission rel. City of Port Townsend vs. Key City Light & Power Company. Rates, etc.

October 20, 9:30 A. M.—Everett, Commission ex rel. Geo. T. Hendrie et al. vs. Everett Gas Company. Rates.

October 29, 9:30 A. M.—Seattle. Rules re telephone collections.

October 7, 9:30 A. M.—Seatlte, Watts vs. Independent Telephone Company. Service.

November 30, 9:30 A. M.—Seattle. Seattle vs. Seattle Lighting Company. Valuation, rates.

NEWS OF ARIZONA RAILROAD COMMISSION.

The Southern Pacific Company has been granted until October 26, 1914, to show cause why it should not be punished for contempt of the commission's order regarding locomotive headlights.

The Winslow Gas Company has been authorized to issue first mortgage 7 per cent gold bonds in the amount of $60,000, to be used in the erection of a gas plant and distribution system at Winslow.

The Arizona Hydraulic Power Company has been authorized to purchase the power site and water rights of the Pacific Water Power Company and E. H. Meek on the Verde River to be paid for by 100,000 shares of stock. A $2,000,000 bond issue has also been authorized to be used in the construction of dams, storage works, power plants, transmission lines, etc.

The Salt River Electric Railway Company has been granted a certificate of convenience and necessity for the purpose of constructing, operating and maintaining an electric street railway system in the city of Phoenix.

TRADE NOTES.

NePage, McKenny & Company, electrical engineers and contractors with offices in all of the chief Pacific Coast cities, announce from their Seattle offices that they have secured the contract for complete electrical installations in the eleven-story Stuart building now under construction in Seattle, the contract approximating $12,000. They have also secured the contract for the electrical work complete in the Oakland auditorium at Oakland, California, amounting to $35,000. This job calls for seven switchboards.

Colby Engineering Company of Portland has recently installed a 500 kw. Curtis turbo generator, with Lyons boiler equipped with Dutch oven and auxiliary oil burners for the Tillamook Light & Power Company at Tillamook, Ore.

The W. H. Smith Electric Engineering Company of Portland, Oregon, has obtained the electrical contract for the new postoffice being built at Idaho Falls, Idaho. This company also has the electric fixture contract for the Iris apartments at Portland.

The Grand Electric Company of Portland, Oregon has the electrical contract for the new apartment house being built at East Twenty-fourth and Sandy Road, Portland.

The J. C. English Company, fixture manufacturers of Portland, has obtained the contract for the fixtures in the new apartment house located at the southwest corner of Yamhill and Lownsdale streets, and also for the B'nai B'rith Association Building on Thirteenth, near Mill street, Portland.

NePage, McKinney Company have the electrical contract for the building owned by the Labbe estate on Union avenue and Ash streets, Portland, Oregon; also the addition work being installed in the city jail at Second and Oak streets.

M. J. Walsh & Company of Portland, have the electrical contract for the A. O. H. lodge building being erected at Russell and Rodney avenues.

The Truitt Electric Company, Los Angeles, was recently incorporated by Fred L. Somers, Elliott Hinman, Clarence Truitt, George L. Belcher and Thomas Harrison. The capital stock of the company, which will manufacture electric ovens, is $25,000.

The Los Angeles Gas & Electric Company has recently obtained contracts from the city of Los Angeles for the installation of about 500 General Electric magnetite arc lamps.

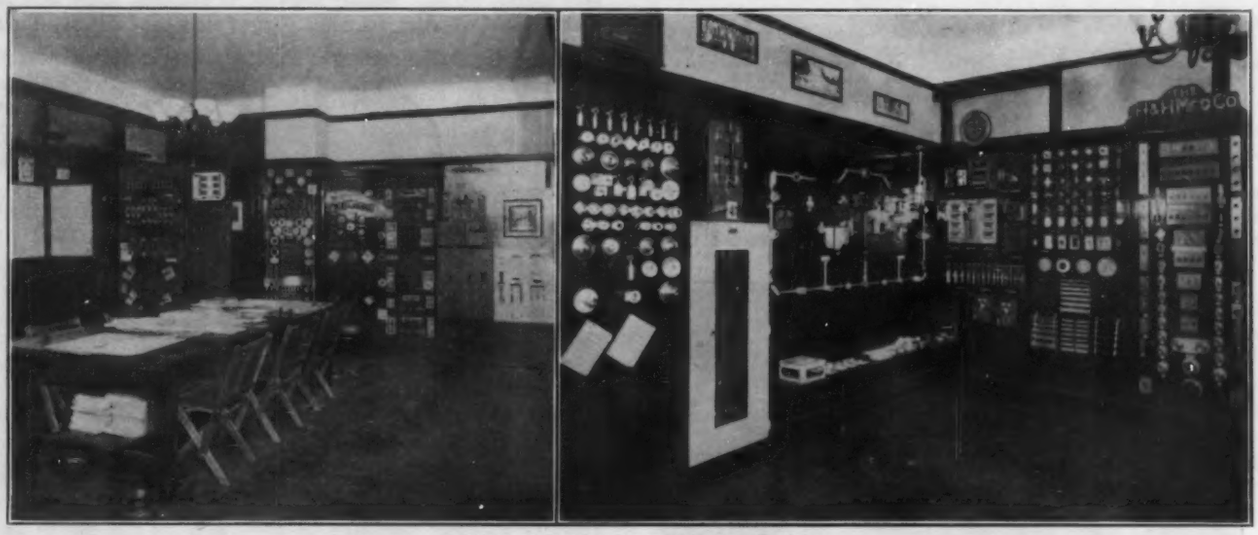
INDUSTRIAL

CONTRACTORS' SAMPLE ROOM.

The California Association of Electrical Contractors and Dealers are maintaining a sample room of electrical wiring devices at their headquarters in the Rialto Building, San Francisco. This is an educative exhibit for architects, their clients and the contractors. This exhibit has been established in accordance with a suggestion made by John Austin, a prominent architect of Los Angeles.

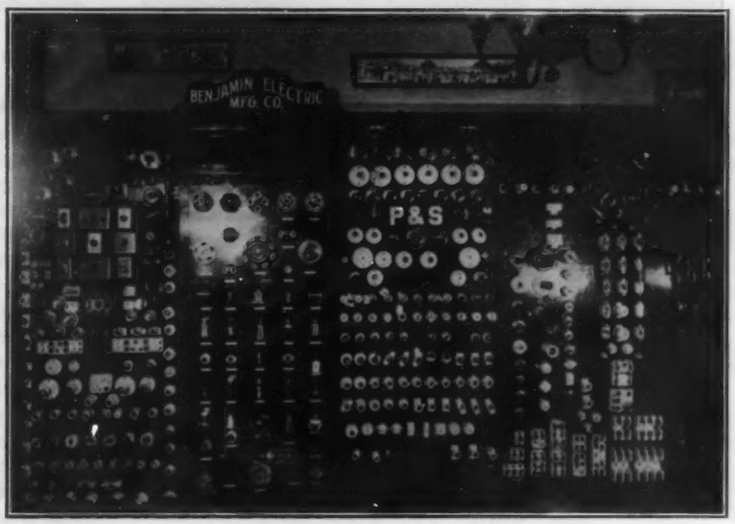
As may be noted from the accompanying illustrations the rooms have been paneled to a height of 7 ft. 2 in. and finished with a plate shelf. Space is rented to various manufacturers, who install their exhibit samples, which are hung loosely so that they may be examined.

The sample room is also used for the office of the secretary and a reading room for the members. Many architects have visited the place and are greatly pleased with the plan. Many contractors also employ the service to find material which they are unable to locate in catalogues.



Section of Contractors' Display Room.

Section of Panel Display.



Section of Exhibit.

The following goods are on exhibition:

Annunciators.
"Edwards."

Attachment Plugs.
Bryant, Benjamin, General Electric, Hubbell, Cutler-Hammer.

Base Receptacles.
Bryant, General Electric, Cutler-Hammer, Arrow E., Hart & Hagerman, Trumbull, Hubbell.

Batteries.
Thos. Edison Inc. National Carbon Co.

Bells.
"Edwards."

Clusters.
Benjamin.

Conduit (Flexible Steel).
Sprague, National Metal Moulding.

Conduit (Non-Metallic).
National Metal Moulding.

Conduit (Rigid).
Sprague, Economy, Sheraduct.

Conduiets.
Crouse-Hinds.

Cutouts.
Union, Bryant, General Electric, D. & W., Trumbull.

Fuses.
General Electric, Union, D. & W.

Letter Boxes.
Western Electric Company.

Metal Moulding and Fittings.
National Metal Moulding.

Outlet Boxes.
National Metal Moulding, Union, Sprague.

Receptacles.
Bryant, Benjamin, Pass & Seymour, Cutler-Hammer, Hubbell, Arrow E.

Rosettes.
Bryant, Arrow E, Pass & Seymour, General Electric.

Sockets.
Bryant, Benjamin, Pass & Seymour, General Electric, Cutler-Hammer, Arrow E, Hubbell.

Soldering Pastes.
Allen.

Switches (Knife).
Trumbull, Bryant, General Electric, A. G. Elec. & Mfg. Drendell Elec.

Switches, (Snap, Flush, Automobile).
Hart & Hagerman, Arrow E, Cutler-Hammer, General Electric, Bryant, Perkins.

Switch Boards—Panel Boards and Boxes.
A. G. Elec. & Mfg. Co., Drendell Elec. & Mfg. Co., Trumbull.

Telephone Cable.
Western Electric Co.

Telephones.
Western Electric Company.

Wire.
Standard Underground Cable Co., General Electric Co., Sprague Electric Co.

THE MAZDA BEES.

The Mazda bureau of the General Electric Company, of which H. H. Cudmore is director, has an organization of specialists to which the success of the preliminary work of the recently established bureau is largely due. Because of the

Clark Baker. F. J. Blaschke. A. B. Bond.

coincidence of cognominal initials of Mr. Cudmore's associates, who busily boost the trademark suggestod in the name of the organization, they have been termed the Mazda Bees.

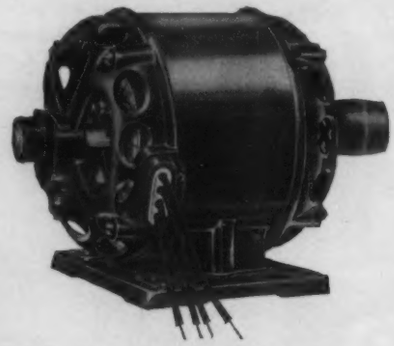
Messrs. Baker and Bond are field representatives and Mr. Blaschke is in charge of publicity and exhibits.

The Mazda bureau staff has been identified with the incandescent lamp industry in various capacities for a number of years. Mr. Baker was in charge of the Cleveland, Ohio, district office of the Westinghouse Lamp Company previous to his present association. Mr. Bond was formerly connected with the home office of the Edison Lamp Works of the General Electric Company in an executive capacity at Harrison, N. J., and Mr. Blaschke joined the bureau after having been engaged in engineering publicity with the National Lamp Works of General Electric Company, Cleveland, Ohio, for several years.

The Mazda bureau is engaged in the exploitation of the Mazda trademark in the Pacific Coast district through intensive, localized, educational publicity campaigns. Distributors and consumers of lamps bearing the Mazda mark, irrespective of brand, are given the services of the bureau and the personal co-operation of its members in the effort to acquaint the current-using public with the meaning of Mazda.

NEW CENTURY MOTOR.

The demand among central station operators for small alternating current motors capable of starting under full load with a low starting current, especially capable of starting on the small fuses usually found in residence districts, and



1/6 h.p. Century Motor.

the demand among the machinery manufacturers for a motor capable of developing a high starting torque, has led the Century Electric Company to develop a 1-6 h.p. motor as an addition to their present complete line of "Century" single-phase motors, which are of the repulsion starting, induction running type.

The same general design and construction prevails in this motor that is characteristic of the remainder of the "Century" line. It is capable of developing a starting torque more than two and one-half times full load torque with a starting current of less than three times full load current, and capable of developing a maximum, when it is up to speed, of approximately 200 per cent of full load torque. It is equipped with phosphor bronze ring oiling bearings which makes it especially valuable for the operation of apparatus in places where the motor is subjected to low winter temperatures. The standard winding is 104-208 volts interchangeable which enables the manufacturer to equip his apparatus with motors and put the complete equipment in stock with reasonable assurance that the motor can be used on either of the prevailing voltages usually found in this country.

This motor has been on the market but a few weeks. There is already a promising demand for it, since it is able to start practically any apparatus which small motors are called upon to drive with the use of only a 3 ampere fuse.

NEW CATALOGUES.

Westinghouse Electric & Manufacturing Company are distributing pamphlets illustrating and describing electric Glue Pots and Glue Cookers and Electric Drive for Flour Mills. Descriptive Leaflet 3693 illustrates and describes Electric Drive for Rubber Calendars, and No. 3742 is devoted to Westinghouse Motor Generator Sets.

A number of interesting bulletins have recently been issued by the Sprague Electric Works of General Electric Company. No. 48,701 is devoted to Sprague Electric Dynamometers for measuring horsepower. Full directions and illustrations are given of approved methods for engineering tests. No. 48,700 illustrates and describes Sprague Monorail Cranes, a device for reducing costs and increasing efficiency in industrial plants. Electric hoists for the efficient handling of all loads, are also illustrated in Booklet 906.

NEWS NOTES

INCORPORATIONS.

POMONA, CAL.—Truitt Electric Company, $25,000, subscribed $50, by F. L. Somers, E. Hinman, C. Truitt et all.

LOS ANGELES, CAL.—Western Imperial Electric Company $200,000, subscribed $500, by G. A. Plutenney, G. W. Grayson, H. C. Jackson, E. E. Whitney Jr. and F. C. Sutphen.

SEATTLE, WASH.—The Summit Lake Power Company has been incorporated with a capitalization of $4,000,000 by Jos. K. Dorr and F. P. Mullen, care Fletcher & Evans, Tacoma.

GARDEN GROVE, CAL.—A number of water companies and other interested parties have united and incorporated the Garden Grove City Water Company with a capitalization of $25,000. The company will erect a large storage tank, install a new pumping plant and construct new distribution lines. The newly elected board of directors is composed of J. D. Price, P. H. German, H. A. Lake, J. T. McElree and J. A. Knapp. J. A. Knapp is president.

FINANCIAL.

SEATTLE, WASH.—An ordinance will be introduced in the council to sell $404,000 light bonds in denominations of $100 and $500 so that citizens may purchase them.

SPOKANE, WASH.—A mortgage covering real and personal property and water rights of the Little Spokane Light & Power Company of Deer Park, has been given to the Spokane & Eastern Trust Company to secure a bond issue of $15,000. The power company plans to extend its service to other towns.

TULARE, CAL.—Active work started this week by the officials of the Tulare County Power Company on the sale of an issue of $400,000 in bonds to the power users who are stockholders of the corporation. As far as is known here the Tulare County Company is the only co-operative electrical power concern in the United States. In a recent statement which was issued by the corporation it was set forth that the physical property of the company, which includes 400 miles of transmission lines, is worth $800,000, against which there is an indebtedness of $300,000. The present bond issue will be used to pay off all indebtedness of whatever description and the $100,000 balance will be put in a fund for betterments and extensions of the lines.

SAN FRANCISCO, CAL.—Hearings before Judge Dooling in the matter of the receivership for the Northern Electric Company asked by the General Railway Signal Company, brought out the fact that unsecured claims amounting to $1,100,000 exist in addition to the interest on the company's bond issues, in default since June 1, 1914. Among the liabilities mentioned is approximately $4,000,000 in promissory notes secured by bonds on which the annual interest is $260,000. There is a further liability of $500,000 on which the interest amounts to $30,000. The open-book accounts are placed at $600,000, bearing an annual interest charge of $42,000. Certain costs must be met and improvements made, the immediate sum necessary for these purposes being placed at $200,000. The petition says that it will be many years before the company will earn all these charges, and that, unless some relief is furnished by the court, the property will be sold piecemeal under judgments obtained in various courts, its value greatly depreciated and the rights of secured creditors imperiled. Most of the $4,000,000 promissory notes described in the petition are indorsed by E. R. Lilienthal, E. J. de Sabla Jr., Louis Sloss and W. P. Hammon, as are the $191,000 funded notes.

ILLUMINATION.

LOS ANGELES, CAL.—At a recent election held at Hawthorne, it was voted to install 84 new street lights. The newly lighted district will include the section known as the Burleigh tract.

LONG BEACH, CAL.—The board of public works has granted a 30 day extension of time to the Woodhill & Hulse Electric Company on the installation of an ornamental lighting system on Broadway.

SPOKANE, WASH.—Promoters of the lighting project on Sprague street are endeavoring to get plans completed in order that the contract may be let at the same time as the First avenue lighting contract.

POMONA, CAL.—A special committee composed of F. E. Whitehouse, Wade Carper, A. T. Richardson, W. M. Doud and W. C. Blackmore has been appointed to further interests of ornamental lighting proposition for Pomona.

SEATTLE, WASH.—A resolution has been passed providing for the installation of a system of cluster lights on Madison street, according to plans prepared by the city engineer. Objections will be heard on October 19th.

AZUSA, CAL.—Preparations are being made to call a $55,000 bond election, the proceeds of which will be used for a water system costing $35,000, and lighting plant, costing $20,000. The lighting system will include lights along Foothill boulevard, Azusa avenue and Center street.

EL PASO, TEX.—Work is under way by the El Paso Gas Company on improvements, including the entire rebuilding of part of the plant, and laying of additional mains, to cost $68,000. At the plant proper a new coal gas plant is to be built. The steel work contract has been let to the El Paso Bridge & Iron Company.

SEATTLE, WASH.—The lighting department allowance for October includes $40,000 for the purchase of cables for an underground system so that materials can be assembled and work begin on removal of poles on Yesler Way and the waterfront districts. Also an additional boiler will be purchased for the steam power plant on Lake Union.

PORTLAND, ORE.—Property owners and business men on Fourth street from Yamhill to Burnside streets have been granted permission by the city commission to install a system of street bracket lights. As soon as plans can be made work will begin. The cost and the lighting bill will be paid by the property owners. President McFaul has appointed John Daniels, D. H. Strowbridge, Robert Andrews, Fred J. Brady and N. N. Carpenter a committee from the East Side Business Men's Club to interview property owners on Grand avenue with a view to having that street illuminated.

BAKER, ORE.—The Eastern Oregon Light & Power Company has filed a notice of appeal in the suit brought against it by the town of Haines, which was decided in favor of the plaintiff by Judge Anderson, August 4. The principal point of divergence between the town and the company is in regard to the construction of the part of the franchise providing for a flat rate for electricity. That the flat rate was not observed is admitted, but the company claims that the franchise properly construed would permit such departures as took place. Judge Anderson held otherwise and ordered the establishment of a flat rate instead of meters.

SALT LAKE CITY, UTAH.—At a meeting of the Salt Lake Federation of Labor on September 30th the annual Utah State Fair was declared to be unfair, this condition resulting from the strike recently declared by the local inside wiremen. The local contractor who had the work of installing festoons, wiring and special lighting about the Fair grounds employed non-union wiremen to complete this job

so that the union linemen of the Utah Light & Traction Company who were engaged in installing the transformers and making the service connection to the grounds were ordered off the job by the State Federation of Labor. The lighting company promptly made other arrangements for the installation of the transformers and the grounds were connected up, the meeting of the Federation on the 30th declaring the entire State Fair unfair was the outcome. The linemen of the Utah Light & Traction Company are on strike so that the work of making service connections and disconnections is temporarily held up.

TRANSMISSION.

SUMMERVILLE, ORE.—The Klees Electric Company is extending its light and water systems into the Grande Ronde Valley.

CHEHALIS, WASH.—A franchise has been granted to the Independent Electric Company for a high tension power line from Winlock to Toledo, by the county commissioners.

HELENA, MONT.—The Montana Power Company has started the preliminary work of extending its power lines from Thompson Falls to the Coeur d'Alene mining district.

WINLOCK, WASH.—The Independent Electric Company, a subsidiary of the Washington-Oregon Corporation, has applied for a franchise to construct and maintain a power line over the county road from Winlock to Toledo, Washington.

PRESCOTT, ARIZ.—The Arizona Power Company has closed another contract for power to be furnished the Clarkdale smelter of the United Verde Copper Company, which will require the generation of additional 2000 h.p. The service is to be ready by November 1.

DUNCAN, ARIZ.—A power plant is to be begun soon in Greenlee county, surveyors having been sent from San Francisco to make surveys for a power project on Black River, at the mouth of Pachete Creek. Backers of the project are F. G. Baum and associates of San Francisco and John Christy of Clifton, a large dam will be built across the Pachete and a hydroelectric plant will be installed.

FRESNO, CAL.—A new electric service line is being built from Santa Maria to Lompoc by the Midland Counties Public Service Corporation, according to announcement made by A. G. Wishon, general manager of the corporation. The new line will cost about $15,000 when completed. The current will be released to the Lompoc Light & Power Company for general distribution, but the chief object of the extension is to furnish electricity to the Kiselguhr Company for mining and manufacturing work, according to Wishon.

SEATTLE, WASH.—Three measures have been introduced in the ciyt council looking toward the acquisition of the Lake Cushman power site. Two of the measures introduced in the city council looking toward the acquisition of an application for rights on all the state and federal lands in the district, which it is proposed to flood. The third is an ordinance directing a thorough examination of the proposed site of the plant by experts and appropriating sufficient money for a similar examination of such other sites as may merit consideration.

TRANSPORTATION.

EUGENE, ORE.—An electric railroad, three miles in length, to operate between Glendale, on the Siuslaw River, and Tsiltcoos Lake, south of the Siuslaw, is contemplated by Siuslaw capital.

SAN FRANCISCO, CAL.—Mayor Rolph's attention has been called to the need of strips or guards on the sides of street cars to keep persons from falling under the wheels, and he has referred the matter to the public utilities committee of the supervisors.

OAKLAND, CAL.—The Key Route service in Twelfth street from Poplar street junction to Broadway, in Oakland, that has been in operation for the past five months has ceased, under directions issued by Mayor Mott. The San Francisco-Oakland Terminal Railways had asked permission of the city council to continue indefinitely that service.

BERKELEY, CAL.—Judge M. T. Dooling of the U. S. District Court issued an injunction preventing the city officials of Berkeley from stopping the Key Route traffic on Shattuck avenue. The street paving fight thus becomes a legal battle with the trains still running. The threatened tie-up was designed to force the Key Route system to pave between its tracks on Grove and Adeline streets.

TURLOCK, CAL.—F. P. Will, superintendent of the Burlingame Railway, proposes to establish a trackless trolley between Turlock and Denair, a distance of four miles, the object being to make connection between the Santa Fe trains, which pass through Denair, and the Southern Pacific trains, which pass through this city. About $20,000 will be required to build the line.

FAIRFIELD, CAL.—The city trustees of Benicia have been asked for a franchise for an electric railroad through the city streets to the city limits on the Vallejo road. The application was made by A. D. Bowen, president of the Benicia Land & Terminal Company, who proposes to build a road from Benicia to Vallejo and a line from Benicia to Winters. Officials of the company state that the Benecia-Vallejo line will be in operation within one year.

TELEPHONE AND TELEGRAPH.

RIVERSIDE, CAL.—The bid of Floyd Brown for a telephone franchise in Palo Verde valley, has been accepted by the board of supervisors.

SAN FRANCISCO, CAL.—Proposals have been taken by the buildings and grounds committee of the Panama-Pacific International Exposition Company for constructing a telephone exchange in the Food Products Building.

CHEHALIS, WASH.—The Farmers' Independent Telephone Association has been granted a franchise to operate over the county roads between Chehalis and Mossy Rock, Washington, the franchise covering a period of twenty years.

SAN FRANCISCO, CAL.—The board of works has awarded two contracts for equipping the new central fire-alarm station in Jefferson Square; that for the underground conduit going to James H. O'Brien for $3115 and that for marble switchboards and appurtenances to the Butte Engineering & Electric Company for $7321.

WATERWORKS.

RED BLUFF, CAL.—A petition calling for an election to bond the city in the sum of $85,000 to establish a municipal water system is being circulated.

ST. MARIES, IDAHO.—The city clerk has been instructed to engage a hydraulic engineer to examine the water supply, also to ascertain the cost of installing an adequate water system.

SPOKANE, WASH.—Commissioner C. M. Fassett has issued petitions for laying water mains in several additions in the northwestern portion of the city. The mains if laid will be paid for on the assessment plan.

SEATTLE, WASH.—L. B. Young, superintendent of the water department, will begin work shortly on the construction of two large steel water mains within the city limits that will cost between $75,000 and $100,000.

SAN DIEGO, CAL.—Mayor O'Neal has announced that when the Vulcan water proposition is voted on there will also be included on the ballot a $500,000 proposition for the development of San Diego River. This proposition was suggested by the Mayor and endorsed by Councilman Wm. G. Henshaw.

GRANTS PASS, ORE.—A proposal from the Rogue River Water Company involving the purchase by the city of the water system has been presented to the council by Mayor McKinstry. The company had set a price of $125,000 upon the system, agreeing to take as payment city bonds at 5½ per cent interest.